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ANNUAL

OF THE

UNIVERSAL MEDICAL SCIENCES

A YEARLY REPORT OF THE PROGRESS OF THE GENERAL
SANITARY SCIENCES THROUGHOUT THE WORLD.

EDITED BY

CHARLES E. SAJOUS, M.D.,

AND

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ASSISTED BY

OVER TWO HUNDRED CORRESPONDING EDITORS, COLLABORATORS,
AND CORRESPONDENTS.

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VOLUME I.



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PREFACE.

IN presenting the eighth issue of the *ANNUAL* to the medical profession, to whose generous support its remarkable success is due, the editor wishes to state that his best efforts to insure the 1895 series an early appearance were again frustrated by the tardy arrival of several papers, coming, curiously enough, from members of the editorial staff who usually were prompt. The editor, in making this statement, in no way wishes to criticise those of his colleagues who delayed him in his work. A long medical career, general and special, has taught him what the exigencies of active work are; these it were ungenerous to overlook, especially when the task assumed by the associate editors and their collaborators is fraught with so much labor. He can therefore but find expressions of thankfulness even for those members of the staff who made his task so arduous this year. To those who, by their promptness, enabled him to at all surmount the difficulties encountered, he wishes to express his deep gratitude.

A number of changes have been made among the associate editors. Owing to the regretted resignation of Professor Whitaker, of Cincinnati, the editorship of the department of Diseases of the Lungs and Pleura was kindly undertaken by Professor Wilson, of Philadelphia, with the collaboration of Dr. Eshner, of the same city. The article is a splendid one, and fully entitled to the highest encomium. Prof. Landon Carter Gray, of New York, with the collaboration of Drs. Pritchard and Shultz, also contributes an exceptionally fine paper upon Diseases of the Brain.

Professor Obersteiner, of Vienna, with his usual thoroughness, reviews and discusses the literature of the year upon Diseases of the Spinal Cord. The editor can safely express the opinion that never before was a better critical review written upon this subject in any language. The articles under the direction of Professors Montgomery, of Philadelphia; Pilcher, of Brooklyn; Keyes, of New York; Fenger, of Chicago; and White, of Philadelphia, are also models of their kind. Another article meriting special mention is that of Professor Rubino, of Naples, upon Diseases of the Stomach, Liver, and Pancreas, written in the English language exactly as presented by the author.

The article on General Therapeutics and Pharmaceutical Chemistry is unusually rich this year,—a fitting tribute to the memory of the great man under whose direction it was prepared. Dr. Dujardin-Beaumetz occupied a unique position in medicine,—one, indeed, that should serve as an example to many. As an investigator few were his peers, but fully as great was his merit as a model of gentleness and sympathy to the sufferers placed under his care. One had but to follow his footsteps in the hospital ward to become convinced of the force which well-directed sympathy adds to the character of the true physician. A kind word here, a tap there, prudent encouragement to the one, a smile to the other, cast a ray of sunshine where gloom had before prevailed. The eyes of all followed him to the door; a silent prayer accompanied him for an early return. That return is now not to be, and among the friends who deplore his loss are thousands who will never forget his kindly intervention in times of suffering and bereavement.

To him fitly applies the words of R. L. Stevenson:—

“The physician is the flower of our civilization; and when that stage of man is done with, and only remembered to be

marveled at in history, he will be thought to have shared as little as any in the defects of the period, and to have most notably exhibited the virtues of the race."

The editor does not wish to lose this opportunity to again thank his editorial assistants for their untiring devotion. Much of the excess of work brought about by delinquencies on the part of the associate editors falls upon their shoulders; the entire literature of the subject has to be ransacked by them, and the articles arranged for the editor, who must, if need be, prepare the article at the last moment.

Mr. H. B. Van Horn, manager of the typographical department, and Mr. T. S. Coom, reader of the same department, have, as usual, done all in their power to sustain the reputation of the work by doing more than their share of duty. It is with pleasure that the editor acknowledges his indebtedness to them, as well as to his publishers, who in many ways facilitated his task.

THE EDITOR.

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DISEASES OF THE LUNGS AND PLEURA.

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AND

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PULMONARY TUBERCULOSIS.

Etiology.—The infective nature of the seminal fluid of tuberculous patients has been studied by various authors, but with results somewhat contradictory in character. Investigations made by Spano,⁵⁰⁵ Nov. 11, '93 however, seem to indicate that the seminal fluid in such cases may transmit the infection, even when the genito-urinary tract is not involved in the disease. Eight cases were observed by the author,—six of pulmonary tuberculosis and two of tuberculous arthritis. In the former and in one of the latter the spermatic fluid was obtained from the seminal vesicles after death, under appropriate antiseptic precautions. In the remaining one it was obtained in the course of an ordinary emission. To exclude the possibility of the existence of a beginning tuberculosis of the genito-urinary tract that might have escaped macroscopical observation, histological examinations were made in all of the fatal cases. Cover-glass preparations were made and stained by approved methods. In three, tubercle bacilli were readily detected; in five, not at all; in one, bacilli were found only after the fluid had been treated with caustic soda and boiled, the supernatant fluid being decanted. Intra-peritoneal injection of a portion of the fluid was practiced in seven cases, with success in five. Vaginal inoculation was practiced in four instances, with success in two. Cultivation experiments were undertaken in six instances, with success in three. In neither of the two cases of tuberculous arthritis was the seminal fluid infective. While the number of observations is perhaps too small to warrant ultimate conclusions, the results are, to say the least, extremely suggestive.

Lehmann⁴ July 9, '94; Aug. 25, '94² has reported the case of a tuberculous woman, 40 years old, who gave birth to a child and died three

days later of tuberculous meningitis. The child died twenty-four hours after birth. In its liver, spleen, and lungs nodules were found exactly resembling tubercles. Tubercle bacilli were also present in large numbers. More advanced tuberculous lesions were found in the mesenteric and bronchial glands. It is believed that the transmission took place through the uterus. Londe¹⁰⁵¹
Dec. 2, '93 details the results of inoculation experiments with the placenta of children born of tuberculous mothers. In the case of one child, whose mother was in the first stage of tuberculosis, the inoculations were attended with negative results. Four other children whose mothers were in a more advanced stage of the disease lived but a short time. In the viscera of one of these bacilli were found, and injection, into the peritoneal cavity of a guinea-pig, of blood taken immediately after birth from the umbilical vein was followed by tuberculosis. In the case of another child inoculation was followed by negative results, while in the remaining two positive results were obtained. In a sixth case the mother, who was suffering from pulmonary, intestinal, peritoneal, and laryngeal tuberculosis, aborted, and inoculation of guinea-pigs with the placenta and foetal blood and organs was followed by tuberculosis, most virulent when the placenta was used. In none of the children was there macroscopical evidence of tuberculosis. In all of the cases the parental tuberculosis was maternal only. Schmorl and Kockel³¹⁷July 7, '94 have reported four cases of placental tuberculosis. In three the placenta were derived from women dead of miliary tuberculosis, and the fourth came from a case of chronic pulmonary tuberculosis. Tubercle bacilli were found in only one of the children.

Goldschmidt³⁴Dec. 26, '93 ; Jan. 27, '94 records three cases of tuberculosis in children in which the infection was probably of intra-uterine origin. One case was that of a child, 16 months old, in which the lungs contained numerous broncho-pneumonic foci and miliary tubercles. The bronchial, mediastinal, and mesenteric glands were enlarged, and the last named caseous. On the under surface of the liver, at the entrance of the round ligament, was a mass as large as a pea, which, upon microscopical and bacteriological examination, proved to be tuberculous. The second case was that of a child, 7 months old, in whose lungs numerous tuberculous nodules were present, some partly caseous, as well as cavities

varying from the size of a pea to that of a hazel-nut, and in one of which tubercle bacilli were demonstrated. There were also numerous intestinal ulcers. In this instance, too, a tuberculous mass was found at the entrance of the round ligament into the liver. The third case was that of an infant, born of a woman who subsequently died of advanced tuberculosis, the child being separated from its mother immediately after birth, and dying of atrophy when 9 weeks old. Numerous large tuberculous nodules, here and there caseating, were found in both lungs, and miliary tubercles in the glands, liver, spleen, and kidneys. The mesenteric glands were caseous. The tuberculous lesions were believed to be unquestionably of longer duration than the infant's extra-uterine life.

Strauss³⁴_{No. 28, '94} found virulent tubercle bacilli within the nasal cavities of non-tuberculous persons whose relations necessitated their association with and frequent presence in rooms occupied by tuberculous patients. The individuals thus studied included male and female hospital attendants, patients that had long resided in the hospital on account of other than tuberculous affections, and clinical assistants. Those belonging to the first and last categories were in perfect health and presented not the slightest evidence of tuberculosis. Observations were made of the dust, the crusts, and the accumulations of mucus in the nasal cavities removed by means of cotton tampons mounted on wooden sticks and sterilized. The tampons and their contents were placed in sterilized water, and this fluid was injected into the peritoneal cavity of guinea-pigs. Twenty-nine animals were thus treated with the secretions from twenty-nine persons. Seven guinea-pigs died in the course of a few days, in consequence of septicæmia or purulent peritonitis; thirteen of the animals remained perfectly well, and upon post-mortem examination presented no sign of disease; while nine died or were killed in from three to five weeks, and presented pronounced tuberculous lesions. Of the twenty-nine persons that furnished the material for inoculation none showed evidence of tuberculosis, but had been for a considerable time in or about the hospital wards. Of the nine whose nasal secretion contained virulent tubercle bacilli, six were attendants who lived in the hospital, cleaned the wards, made the beds, etc.; one was a patient free from tuberculosis, who had long been in the hospital, and two

were clinical assistants (among seven) who spent only a few hours daily in the wards.

Miller ²_{Jan. 13, '94} has reported an instance in which he succeeded in finding tubercle bacilli in the dust from a house in which tuberculous persons had resided. A lady, with her five daughters, four of whom were most of the time at school, took up her residence in a house in which six years previously there had lived a gentleman who had died of pulmonary tuberculosis but a short time after removing from the house. For the next six years the house was occupied by an old lady, who died, but not from pulmonary tuberculosis. Within a year of moving into the dwelling the mother became tuberculous and died at the end of three years. During her illness the eldest daughter displayed symptoms and signs of pulmonary tuberculosis, and left home for six weeks, returning apparently well, and remaining well thereafter. A few months after the death of the mother the second daughter, who had not long been away from school, displayed similar symptoms; but she also recovered after leaving home. Several years later the third daughter, soon after leaving school, presented consolidation of the left apex and died within a short time. Stained cover-glass preparations, made from the dust obtained from the dining-room of the house in which the unfortunate family lived, disclosed the presence of tubercle bacilli in considerable numbers.

Heron and Chaplin, of London, ⁶_{Jan. 6, '94} have made a study of dust obtained from various parts of the City of London Hospital for Diseases of the Chest, and from a house in which no tuberculous patient had lived for forty years, and from expectoration containing tubercle bacilli which had been allowed to stand for six months. The dust was taken from the main outcast-shaft of the hospital, from the out-patient waiting-rooms, from beneath a large table in one of the wards, and from the pathological work-room. Inoculation experiments were made with one hundred guinea-pigs, a mixture of the dust with sterilized water being injected in some instances, but in the greater number a portion of the dust being introduced by means of sterilized forceps into the sub-peritoneal tissue through an incision made in the flank with a sterilized knife. In the whole series of experiments tuberculosis developed in but two animals; both were guinea-pigs injected with the dust taken from the main air-shaft of the building.

Boulland ¹¹⁴⁵ ¹⁰⁵¹_{No. 9, p. 129; No. 4, '93} calls attention to two possible channels of communication which have hitherto received little or no consideration. The exposed cavity left in the gum after a tooth has fallen out spontaneously or has been removed surgically presents an absorbing surface capable of affording lodgment for tubercle bacilli that may be present in insufficiently-cooked tuberculous meat or other food. Under these circumstances tuberculous involvement of the glands of the neck may be the first indication of infection. The second mode of infection is by the entrance, during labor, of blood of the mother, containing tubercle bacilli, into the ear of the child, with the subsequent development of a tuberculous, suppurative otitis, which may, in turn, lead to general infection. It thus becomes a wise precaution to irrigate with an antiseptic solution the ears of children born of tuberculous mothers.

Kerez ⁵⁰_{Jan., 16, '94} has made some observations with a view to determine the transmissibility of tuberculosis through cigars. Sputum containing tubercle bacilli in abundance was placed between the leaves of tobacco before these were rolled, and for control purposes also spread upon paper which was placed in a sterilized tube, both cigars and paper being kept at a temperature of from 28° to 30° C. (82° to 86° F.) for a period varying from ten days to five weeks. At the end of this time the cigars were unrolled, and both they and the paper were separately washed with sterilized water and well scraped. With this material intra-peritoneal injections were made into guinea-pigs. It was found that tuberculosis developed in those animals inoculated with the washings of infected cigars that had been exposed to the temperature stated for not more than ten days, while the sputum dried on paper retained its virulence up to the fourth week. The conclusion arrived at is that tobacco has a germicidal action upon tubercle bacilli.

Fenwick, of London, ²_{Jan., '94} relates two cases of destruction of the mucous membrane of the stomach by corrosive fluid, followed by the development of acute pulmonary tuberculosis. One of the patients was a man, aged 34, who swallowed oxalic acid with suicidal intent. Four months afterward symptoms of acute pulmonary tuberculosis manifested themselves, and death ensued within six weeks. An autopsy revealed caseous tubercles involving both

lungs from apex to base, with a small vomica in the right upper lobe. The second case was that of a man, 32 years old, who accidentally swallowed some nitric acid. About six months later he began to suffer with cough, night-sweats, and high temperature. Progressive consolidation of the lungs took place, and death from exhaustion ensued in seven weeks. On post-mortem examination the lungs were found to be the seat of acute pulmonary tuberculosis from apex to base.

Bollinger³⁴_{Jan., '94} records a hitherto-unpublished observation, made fourteen years ago in a healthy calf, 3 months old, inoculated intra-peritoneally with tuberculous fluid from a human lung. There was found, seven months later, characteristic *perlsucht* of the peritoneum. Microscopical examination proved the nodules to be identical with those of spontaneous *perlsucht* in cattle. Of ten guinea-pigs inoculated by Bollinger³¹⁹_{Mar. 31, '94} with the blood of cows suffering with *perlsucht*, one died of tuberculosis.

Bacteriology.—De Man³²⁴_{V. 12, p. 143; Feb. 1, '94} has found that tubercle bacilli are destroyed at 55° C. (131° F.) after four hours' exposure; at 60° C. (140° F.) after an hour; at 65° C. (149° F.) after one-fourth of an hour; at 70° C. (158° F.) after ten minutes; at 80° C. (176° F.) after five minutes; at 90° C. (194° F.) after two minutes; at 100° C. (212° F.) after one minute. A temperature of 55° C. (131° F.) for three hours diminishes the virulence of the bacillus, while exposure for twelve hours at 50° C. (122° F.) has no effect. The practical outcome of these observations is the deduction that for the perfect sterilization of milk a temperature of from 60° to 70° C. (140° to 158° F.) is necessary. It has been found that heating milk at 70° C. (158° F.) for several minutes does not affect its taste.

Jakowski⁵⁰_{Dec. 9, '93} examined the blood in nine cases of tuberculosis in the hectic state, and found pyogenic cocci in seven: staphylococcus pyogenes aureus alone twice; in association with the staphylococcus albus twice and with streptococcus pyogenes once; streptococcus pyogenes twice alone, and in association with staphylococcus pyogenes aureus once.

Pathology.—Prudden¹_{July 7, '94} has made an experimental study of the concurrent affections and the formation of cavities in acute pulmonary tuberculosis, the results of which he summarizes as follows: The action of the tubercle bacillus in the body is complex. It can induce cell-proliferation, exudative and productive inflam-

mation, local obliteration of blood-vessels, simple necrosis and coagulation necrosis, and systemic poisoning or septic intoxication. These effects vary with the seat of the lesion, the virulence of the germs, and the susceptibility of the affected individual. The lesions of pulmonary tuberculosis are subject to variation, first, on account of the complexity in the direct action of the tubercle bacillus in the ways indicated; second, as the result of different modes of distribution of the tubercle bacilli, such as through the blood-vessels or the lymph-vessels, or through the air-passages by aspiration; third, as the result of a concurrent infection of the lungs with other germs.

A considerable amount of exudative pneumonia in lungs which are the seat of tuberculous inflammation may be caused by the tubercle bacillus alone. An exudative pneumonia of varying extent and of extreme significance may occur in lungs which are the seat of a tuberculous inflammation as the result of a secondary infection with other germs. The germs most frequently concerned in this secondary infection are the streptococcus pyogenes, the micrococcus lanceolatus (the "pneumococcus"), and the staphylococcus pyogenes. The exact frequency of this secondary infection and the relative significance of the different germs involved are to be determined by further studies.

Experimental studies on the rabbit show that it is possible, by the introduction of the tubercle bacillus into the lungs through the trachea, to induce varying phases of pulmonary tuberculosis, some of which are practically identical with certain forms of acute pulmonary tuberculosis in man, save that the formation of cavities is of exceptional occurrence. These studies further show that the introduction of cultures of the streptococcus pyogenes into rabbits' lungs which are already the seat of extensive tuberculous consolidation and necrosis is followed not by an increased amount of exudative pneumonia, but, in many cases, by the extensive development of cavities.

Strauss, of Paris, ³_{May 30, '94} does not attach much importance to the secondary infections of pulmonary tuberculosis. ²_{June 30} In thirteen cases presenting hectic fever, careful bacteriological examination of the blood failed to disclose the presence of micro-organisms. In many cases it was not possible to detect post-mortem pyogenic cocci in the pulmonary lesions, and when these organisms were found

they were destitute of virulence. He points out, further, that while the introduction of tubercle bacilli into the veins of a guinea-pig is followed by acute miliary tuberculosis of the lungs, the injection of the micro-organisms into the trachea is followed by the development of broncho-pneumonia with caseation and the formation of cavities, tubercle bacilli exclusively being found in the lesions.

Huguenin, of Zurich ²¹⁴_{July 1, '94} insists upon the importance of the secondary infections of pulmonary tuberculosis, referring to biological investigations demonstrating the increased virulence due to the associated presence of two or more bacteria of different kinds. He points out the dangers liable to result from the presence of several forms of micro-organisms in the lymph-passages and in the bronchi. To the pyogenic cocci alone are ascribed certain broncho-pneumonias, as well as pyæmic symptoms. These organisms may likewise be held responsible for suppurative processes in the lungs, resulting in the formation of abscesses and sometimes in ulcerative destruction of the coats of the vessels; besides, the symptoms due to the presence of the toxic products of these organisms must not be ignored.

Law, of Cornell University, ²⁰²⁹_{May 12, '94} contends that cooked meat and milk from tuberculous animals are dangerous on account of the contained chemical poisons generated by the tubercle bacilli. He cites cases in which invalids drinking the milk of tuberculous cows suffered obviously, but improved as soon as such milk was withheld. He observed that calves sucking tuberculous cows did not thrive, though they took all the milk furnished, and that when weaned and fed on solid food they thrived much better. On following such calves until they grew up and were slaughtered, old, calcified tubercles were found.

Huchard ³¹_{Apr. 28, '94} quotes Potain as having observed a constant co-existence between mitral narrowing and pulmonary tuberculosis in a large number of cases. From this observation the deduction is made that the mitral lesion is of tuberculous origin, and that it in turn leads in some degree to the cure of the pulmonary tuberculosis. It is believed that all diseases of the heart leading to pulmonary congestion retard the evolution of tuberculosis of the lungs, while all diseases of the heart leading to pulmonary ischaemia favor the development of tuberculosis of the lungs.

Hecker ³⁴_{No. 29, '94} has made a study of tuberculosis in children and

infants. He found that the records of the Munich Pathological Institute from April 1, 1888 to February 20, 1892, contain reports of 700 post-mortem examinations of children up to the age of 15. Of these the cause of death in 97 was stated to be tuberculosis (13.9 per cent.), while 50 children dead of other diseases presented latent tuberculosis. Thus, 147 among 700 children—that is, one-fifth—were tuberculous. The glandular system in these cases was affected in 92 per cent., next in frequency being the lungs. In the first five years of life caseous pneumonia preponderated, while acute miliary tuberculosis and chronic pulmonary tuberculosis were more frequent at a later age.

Valland¹⁴⁷_{Sept., '94} maintains that tuberculous infection of the lungs in later life is secondary to tuberculosis of the lymph-glands in childhood. In 101 of 108 tuberculous individuals he found enlarged cervical lymph-glands. Among 2506 persons examined enlarged cervical glands were found, between the ages of 7 and 9, in 96 per cent.; between 10 and 12, in 91.6 per cent.; between 13 and 15, in 84 per cent.; between 16 and 18, in 69.7 per cent.; and between 19 and 24, in 68.3 per cent. Tubercle bacilli were found in the cervical lymph-glands in about 68 per cent. of adults.

Schlenker,²⁰_{B.134,H.1}; ⁹⁹_{Mar.22,'94} among 106 autopsies, found pleural adhesions in 85, and of this number the condition could in 28 be attributed to non-tuberculous affections of the lungs or to cardiac disease. Of the remaining 57 the adhesions, according to macroscopical examination, could be referred in 33, or 57.9 per cent., in all probability to a tuberculous cause. Among 100 bodies of adults and children examined post-mortem the same author⁵⁰_{Apr.7,'94} found tuberculosis in 66. It was the principal disease or was the cause of death in 53, had reached considerable proportions in 6, and was latent in 41.

Symptomatology.—Upon the basis of 15 cases, of which 13 terminated fatally, Fraenkel and Troje¹¹⁴_{B.24,H.1,'94} describe a pneumonic form of acute pulmonary tuberculosis. The symptomatology is that of a lobar pneumonia of the lower lobe in a robust individual without hereditary predisposition. Dyspnœa and cyanosis are absent and percussion discloses areas of dullness that clear up. In perhaps half of the cases tubercle bacilli are found in the iron-rust or greenish expectoration; the urine yields the diazo-reaction,

and toward the close of the illness emaciation becomes marked and the case rapidly terminates fatally. Of 7 of the cases studied bacteriologically tubercle bacilli exclusively were found in 4, while 3 presented mixed infection.

Grawitz, of Berlin, ⁶⁹_{Dec. 21, '93} has made a study of the blood in pulmonary tuberculosis, devoting especial attention to the number of the red and white cells, to the dry residue of the blood and of the blood-serum, and to the specific gravity. He found that at the onset of chronic pulmonary tuberculosis a diminution occurs in the number of red blood-cells and their dry residue; while in the second stage, despite great pallor and emaciation and the existence of cavities, the number of red cells is almost normal, in some instances above the normal, with a normal or slightly-subnormal dry residue. In advanced cases, however, attended with fever of considerable degree, and particularly in the acute forms of inflammatory pulmonary tuberculosis, there is a diminution of all of the constituent elements.

Zechanowitsch ²¹_{June 9;} ⁶⁷³_{Oct., '94} has reported a case of tuberculosis attended with sweating of the right side of the face, particularly of the forehead, while the left remained unaffected. It is noted that the right lung and the right half of the larynx were involved in the morbid process.

Gönnér, of Krems, ⁴⁴⁸_{No. 30, '93} maintains that the night-sweats of pulmonary tuberculosis are due to an effort on the part of nature to eliminate through the skin the carbonic acid that fails of elimination through the lungs, and that measures directed to their suppression are harmful.

Strümpell ⁵⁹_{Feb. 3, '94} classifies the various forms of fever in the course of pulmonary tuberculosis as follows: 1. *Status subfebrilis*; the morning temperature is normal; the evening, 100.4° to 101.3° F. (38° to 38.5° C.). The disease makes but slow progress, and amelioration may be expected by improving the general condition. 2. *Febris hectica intermittens*. This type of fever (morning, nearly normal; evening, 101.3° to 104° F.—38.5° to 40° C.) indicates that the disease is steadily advancing, though a feeling of good health may be maintained for a considerable time. 3. *Febris remittens* (morning, 100.4° to 101.3° F.—38° to 38.5° C.; evening, 103.1° F.—39.5° C.). This type is far more unfavorable, as it points to the presence of lobular inflammation. 4. *Febris continua*.

Except in miliary tuberculosis, this form of fever is found almost exclusively in cases of pulmonary tuberculosis that set in with acute symptoms, though it may be found interpolated for several days in cases in which the fever otherwise runs a remittent or irregular course. In either case the prognosis is unfavorable. The last remark is equally true of the fifth type of fever, that totally-irregular form which is observed throughout the whole illness in many cases, though only in the last stage in others. Variations from these types are ascribed to complications.

Revillet ⁶_{Oct. 14, '93} calls attention to the occurrence of depression above the clavicles during inspiration as a physical sign of early pulmonary tuberculosis. The phenomenon is believed to depend upon tuberculous pleurisy at the apices. The symptom is most significant when unilateral, or, if bilateral, when it is more pronounced upon one side than upon the other.

Thomas ²¹²_{Nov. 10, '93} calls attention to the occurrence of swelling of the breast in conjunction with pulmonary tuberculosis. The phenomenon usually appears in the course of the disease, but sometimes it may precede this by several years. Sometimes the superficial veins are dilated. Palpation, as a rule, occasions pain. Sometimes the surface is hot.

Wolfenstein ⁹_{Sept. 30, '93} calls renewed attention to paræsthesia of the pharynx and larynx as a premonitory symptom of tuberculosis of the lungs and reports two illustrative cases.

Destrée, of Brussels, ²⁰²²_{94; May} ⁶⁷³ states that unequal dilatation of the pupils is frequently to be observed in tuberculosis. If the disease is unilateral, the pupil is most dilated on the affected side; if bilateral, the dilatation is variable. This inequality of the pupils is not observed in other diseases of the lungs (bronchitis, emphysema, pneumonia), but may follow an ancient pleurisy. It may be produced artificially by irritation of the great sympathetic in the thorax of animals. Excitation of the hilum of the lung causes pupillary dilatation of the same side. This condition of irritation is to be observed clinically in cases of tuberculous glands. The ganglia being altered and hypertrophied before the tuberculous lesions of the lungs are notably developed, mydriasis may occur early and form a sign, a warning. The author observed this mydriasis in one case five years before the pulmonary affection manifested itself. The possibility of its being of value in the

early diagnosis of pulmonary tuberculosis, therefore, is worthy of consideration.

Hirtz, of Paris, ¹⁴_{June 10, '94} relates seven cases in which phlebitis of one or another extremity appeared at the onset of pulmonary tuberculosis, or even several months before the manifestation of symptoms of the constitutional condition.

Bezançon ⁹²_{Jan. 10, '94} discusses the tachycardia occasionally observed in pulmonary tuberculosis. The phenomenon is always considered to be grave. After it has persisted for a short period the heart begins to fail, the pulse becomes so feeble as to be uncountable at the wrist, and the patient suffers from dyspnoea, cyanosis, and œdema of the lower limbs. In some cases the disturbance may be due to pressure on the pneumogastric by enlarged mediastinal glands. In others it may be explained by supposing a diminution in the calibre of the air-passages. In still others it may be due to the presence of certain toxins, generated either by the bacillus tuberculosis or by the micro-organisms (staphylococci and streptococci) which give rise to the secondary purulent infection so common in pulmonary tuberculosis.

Rosenbach ¹¹³_{No. 23, '93} calls attention to a peculiarity of the breath of tuberculous patients, slightly resembling that of mild cases of putrid bronchitis, but differing from this in having a disagreeably sweet quality. It may become apparent in the neighborhood of the patient, even in the absence of expectoration. It adheres to expectorated matter but feebly, being probably dependent on volatile substances. It is only present in the exhaled air, and thus becomes most evident when the patient coughs or breathes with open mouth. It is a sign of unfavorable prognostic significance, even though the other manifestations in the case appear favorable. It is often present when the destructive process is not marked, and is most noticeable when the physical signs are unobtrusive. It is almost always an associated manifestation of disseminated broncho-pneumonic consolidation. It is wanting in cases of extensive infiltration, when cavities have formed, and also when the sputum is copious. In a large number of cases in which this symptom was observed, hæmoptysis occurred. Night-sweats, anorexia, and febrile exacerbations were also frequently noted. The phenomenon is of diagnostic significance, as it early indicates the occurrence of a morbid process in the lungs, and should there-

fore be sought for in all doubtful cases. To insure against a possible source of error, the mouth and teeth of the patient should be first thoroughly cleansed.

E. Weill, of Lyons, ²¹¹_{May 20, '94}; ⁶⁷³_{Oct.} has observed a special syndrome in three cases of infantile pulmonary tuberculosis which he believes to have been as yet unnoted. It consists in a sensation of cold with perceptible lowering of the peripheral and central temperature, marked cyanosis of the extremities with noticeable modification of the radial pulse, considerable alteration in the number of red cells in the cyanosed portions, and in the composition of the urine. These conditions are readily produced by having the patient leave his bed, and they slowly disappear when he lies down. They are transitory symptoms, of an intermittent character, independent of the clinical form of the tuberculosis, of the stage of the disease, of the season, or of the diet.

Robin ³⁶⁰_{May, June, '94} has found that in the early period of pulmonary tuberculosis the amount of urine tends to increase. In the second period the quantity is less, but still above normal. In the third the diminution is more marked, though some patients still pass considerable quantities. In tuberculosis in the aged polyuria is less frequent. No parallelism was observed between polyuria and phosphaturia.

As the result of an investigation undertaken to determine the diagnostic significance of indicanuria, Djouritch ¹¹⁸_{Feb., '94}; ⁵_{May, '94} has found that indican is present in normal urine, but in so small a quantity that indicanuria must be considered a pathological phenomenon, especially in children, whose diet is less nitrogenous than that of adults. As indican is a derivative of indol, indicanuria is especially accentuated in diseases attended with overproduction of indol. Such an overproduction is especially encountered in acute and chronic diseases of the digestive tract. Indicanuria has been found as a constant and permanent manifestation in tuberculosis, and it would seem that a direct relationship exists between the two. The only explanation, in the absence of digestive derangement, is the profound depression of general nutrition. Gehlig, of Neisse, ³⁶⁶_{Aug. 6, '94} has found that infants nourished with sterilized cows' milk show at times small amounts of indican in the urine, even if the digestion is normal. In case of digestive derangement indican is almost always present, the amount increasing with the intensity

of the derangement. In older children with normal digestion the presence of small amounts of indican in the urine is the usual condition, as well as in adults. This excretion is increased after the ingestion of food rich in nitrogenous matters, particularly meat and eggs. No relation between tuberculous disease and increased elimination of indican could be determined. From clinical observations, Giarre³⁷⁶_{p.98, '93} arrives at the conclusion that indicanuria cannot be considered as of significance in the diagnosis of tuberculosis in children. On the other hand, Fahm,³⁶⁶_{Bd.37,p.176, '94} in 15 cases of surgical tuberculosis, found indicanuria present in 61 per cent. and absent or scarcely appreciable in 39 per cent.; while in 14 cases of non-tuberculous affections it was present in 40 per cent. and absent or scarcely appreciable in 60 per cent.

Osler, of Baltimore,⁹_{Dec.2, '93} has reported the case of a man, 47 years old, who presented tuberculosis of a group of glands in the left cervical region, together with a miliary tuberculosis of moderate intensity in the liver and spleen. He presented a picture of the most profound toxæmia, terminating fatally. Repeated examination during life failed to disclose the presence of tubercle bacilli in the scanty muco-purulent expectoration.

Howard⁵¹_{Nov., '93} has recorded a case of sudden death from pulmonary hæmorrhage in a girl, 2 years and 10 months old, with a good family history, who had been "delicate," but had escaped the usual diseases of childhood. Three days before death examination disclosed the existence of condensation over the central portion of the left lung. There was some cough, fever, and dyspnoea, but no expectoration, and the child seemed comfortable and continued to play in the open air. Death suddenly took place at night from pulmonary hæmorrhage. Post-mortem examination disclosed the existence of primary caseous tuberculosis of the bronchial glands, with calcification, and secondary chronic tuberculous pneumonia in the left lung, with cavity formation. The hæmorrhage had taken place from the rupture of a large vessel in the cavity in the lung. The bronchi and air-vesicles of the right lung were filled with aspirated blood. The mesenteric glands were enlarged, and on section several proved to be the seat of miliary and caseous tuberculosis. The spleen presented a condition of acute miliary tuberculosis.

Osler, of Baltimore,⁵¹_{Dec., '93} reports two cases of tuberculosis at-

tended with general anasarca. The one occurred in a colored child, aged 3, in which albumin was present in the urine, together with hyaline and granular casts. Upon post-mortem examination there was found tuberculosis of the bronchial glands, tuberculous broncho-pneumonia, and scattered miliary tubercles in the lungs, as well as a tuberculous ulcer in the ileum, just at the orifice of the ileo-cæcal valve. The lymph-glands of the hilus of the liver were large and caseous, and a caseous mass was present in Douglas's *cul-de-sac*, beneath the peritoneum. The second case was also in a colored child, 9 years old, in which there existed primary tuberculosis of the intestines, with secondary involvement of the mesenteric and retroperitoneal lymph-glands, miliary tuberculosis of the peritoneum, liver, pleura, and lungs, and tuberculosis of the bronchial glands.

Watkins, of New York, ⁵⁹_{July 14, '94} insists upon the importance of what he describes as granular masses, or third corpuscles found in the blood in cases of tuberculosis, considering them as pathological products, and exclusively distinctive of the tuberculous process.

Mejia, of Mexico, ¹⁴_{Apr. 29, '94} points out that the symptoms and course of tuberculosis vary in Mexico at different altitudes. At low levels the disease pursues a more rapid course than at higher levels, where it manifests a tendency to become chronic and to be gradually cured.

Complications.—Snell ⁶_{Sept. 30, '93} has observed a fatal case of subcutaneous emphysema following rupture of a pulmonary cavity. It occurred in a laborer 32 years old. Upon post-mortem examination the upper lobe of the left lung was found filled with tuberculous nodules of various sizes, the largest breaking down into purulent material. The upper and middle lobes of the right lung were riddled with tuberculous nodules. Near the apex was a cavity of irregular shape as large as a walnut, over which the pleural surfaces were extensively adherent. This cavity extended upward by an irregular ulcerating tract, which passed through the pleura at the apex and allowed a probe to be passed through it behind the first rib. There was no pneumothorax.

Colas ⁵⁵_{Mar. 10, '94} has reported a case of generalized subcutaneous emphysema, complicating pulmonary tuberculosis, in a child 9½ years old, death resulting from asphyxia. Upon post-mortem examination the summits of the lungs were found stuffed with sub-

pleural tuberculous granulations. Compression of the lungs caused the escape of air beneath the visceral layer of the pleura. Behind the pericardium was found a large air-sac, formed by the detached pleura in the region of the right bronchus.

Syme, of Gamlingay,²_{June 23, '94} describes the case of a girl, 14 years old, with consolidation of the upper half of the right lung, in whom pain appeared in the right arm, chiefly down the inner side. In a week or two the arm and fingers became completely paralyzed and remained so for some six weeks, when movement began to return, the severe pain having ceased somewhat earlier. Movement returned first at the elbow-joint, then at the shoulder, and finally returned at the thumb and wrist, but the fingers remained paralyzed. The inference is that the brachial plexus was implicated in the inflammation of the cellular tissue consequent on the irritation caused by the pleurisy over the right apex. Souligoux and Besançon⁷_{No. 22, '93} have reported a fatal case of pulmonary tuberculosis with pleurisy, in which the extension of the pleural complication was followed by the development of an abscess of the thoracic wall.

Legay and Legrain³⁶⁰_{Sept., '93} describe the case of a man, 28 years old, with a good family history, who developed bronchitis after a wetting, tuberculosis supervening. The sputum contained, besides tubercle bacilli, branching filaments, which were believed to be thrush-fungi. Physical examination disclosed the presence of signs of chronic pneumonia at the base of the lungs, but no evidences of thrush of the tongue or pharynx could be detected. The glands of the neck were enlarged. The case terminated fatally, but an autopsy was not permitted.

Winogradow⁵⁸⁶_{No. 7; June 30, '94}²¹ reports a case of chronic pulmonary tuberculosis complicated by a proliferating lymphangitis of the gluteal muscles. In this situation there was an abscess which, upon being opened, presented small, grayish, miliary nodules. These, upon microscopical examination, were found to be dilated lymphatic vessels filled with oily contents, and between which there were numerous intercommunications. Marchiafava⁴¹_{July 16, '94} observed a case of miliary tuberculosis of the thoracic duct at a point forty-five centimetres from its entrance into the subclavian vein. There was, besides bilateral pulmonary tuberculosis, pleuritis and caseous tuberculosis of the liver and spleen.

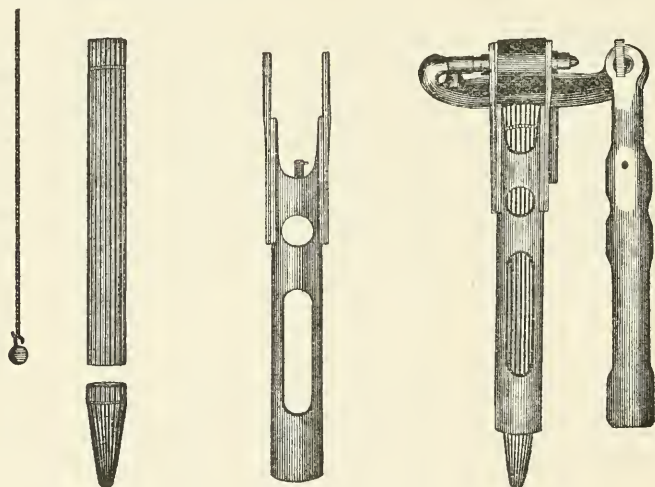
Carrière, of Bordeaux, ²⁵_{June, '94} records a case of hydropneumothorax, in a tuberculous child 7 years old, in which resorption of the pleural effusion was followed by arrest of the progress of the pulmonary process.

Diagnosis.—As the outcome of a careful study of thirteen cases of the pneumonic form of acute pulmonary tuberculosis, Fraenkel and Troje ¹¹⁴_{B.24,H.1-6}; ⁹⁹_{Aug.23, '94} note the following points of differentiation from acute lobar pneumonia: There is no critical fall of temperature, although the presence of diffuse crepitation may give an impression of beginning resolution. If febrile remission occur and resemble a crisis, the temperature soon again rises and progresses with irregular variations. At times the inverse type of fever is present. Dyspnoea and cyanosis are frequently absent, but the face and mucous membranes become pallid with comparative rapidity. The sputum presents a greenish color, and contains tubercle bacilli. The diazo-reaction may be obtained from the outset. There is rapid loss of strength and deterioration in the general condition, out of proportion to the severity of the other symptoms.

Sterling, of Russian Poland, ⁵²⁰_{No.7, '94}; ¹⁰⁹_{July} has found the following method of sputum examination for tubercle bacilli useful: Into a glass cylinder having a capacity of 100 cubic centimetres ($3\frac{1}{4}$ ounces) are poured 10 cubic centimetres ($2\frac{1}{2}$ fluidrachms) of water, 6 cubic centimetres ($1\frac{1}{2}$ fluidrachms) of carbolic acid, and from 10 to 15 cubic centimetres ($2\frac{1}{2}$ to $3\frac{3}{4}$ drachms) of sputum. The vessel is closed with a glass stopper and energetically shaken until its contents assume an homogeneous, milky appearance, after which the cylinder is filled with water, again shaken, and its contents poured into a conical glass and permitted to settle. The sediment is then spread on cover-glasses and stained by the Ziehl-Neelsen method.

For the detection of tubercle bacilli present in sputum in small numbers, Ilkewitsch, of Moscow, ⁵⁰_{Feb.5, '94} recommends the mixing of about $\frac{1}{2}$ cubic centimetre ($7\frac{3}{4}$ grains) of sputum with 20 cubic centimetres (5 fluidrachms) of distilled water in a small dish, to which from 8 to 12 drops of a 30-per-cent. solution of potassic hydrate are added, the mixture being constantly stirred until vaporization ensues. After the sputum has been completely dissolved, a small amount of casein is added and its solution facili-

tated by the further addition of a drop or two of potassic hydrate. The mixture is now poured into a test-tube and acetic acid added, drop by drop, until coagulation of the albumin is first noted. The fluid is now poured into the cylinder of a centrifugal apparatus and revolved until its constituent elements are separated. When separation has taken place a small brass sphere, suspended by a thread, is lowered over the collected sediment and the superimposed fluid poured off. (See illustration.) The sediment is then stained by the Ziehl-Neelsen method.



DETECTION OF TUBERCLE BACILLI. (ILKEWITSCH.)

Centralblatt für Bacteriologie.

Evans, of Brooklyn,¹⁵⁷_{Nov., '93} lays great stress upon the importance of mensuration in the physical diagnosis of pulmonary tuberculosis. He has devised a cyrtometer, consisting of brass bar-metal (five-eighths inch), to form an elliptical frame twenty-one by fifteen inches. This frame hinges at one end and opens at the other of the two points which limit its greatest diameter. At the point of opening a pin operates to make the instrument firm when closed. The frame is perforated, horizontally, by sixty-two grooves or channels, thirty-one on each side, through which brass rods (three-sixteenths inch) slide, converging toward the centre; these rods may be fixed at any point desired by small set-screws, which operate from the upper surface of the frame. (See illustration.)

The instrument operates as follows: The rods are pushed

through the grooves of the frame toward the outside until their centric ends are all on a line with its inner margin; the frame is then opened and the patient placed within so that the antero-

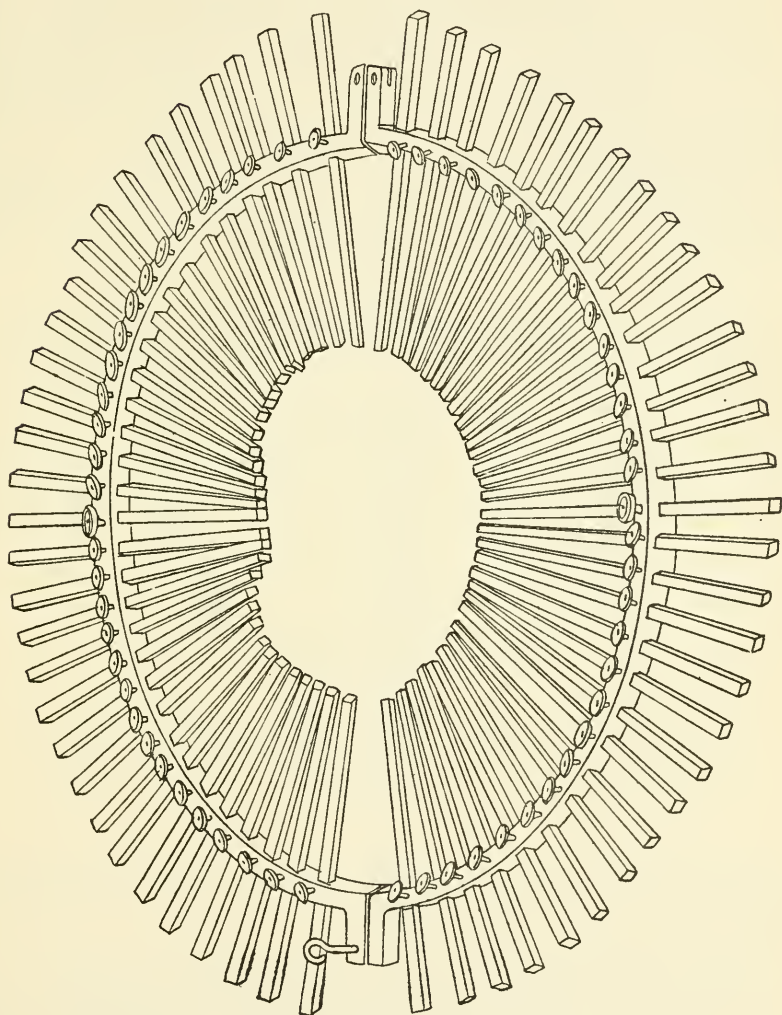


FIG. 1.—CYRTOMETER. (EVANS.)

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posterior diameter of the chest corresponds to the short diameter of the ellipse; the frame is then closed, and when the desired level has been attained the rods are pushed snugly against the chest and fixed in that position by the set-screws, care being taken

that the sixteenth rod from either end in front is opposite the median line of the sternum, while at the back the corresponding rod is opposite the spinous process.

The chest may be abnormally small,—*i.e.*, diminished in all its diameters without being otherwise deformed; in such a case the lungs are likewise too small, either as a result of congenital defect or of the atrophic emphysema of old age; in the latter event the supra-clavicular space will be depressed. In abnormally small chests the ribs assume a more oblique direction.

In abnormal general enlargement of the thorax, most frequently due to hypertrophic emphysema, the ribs assume a more

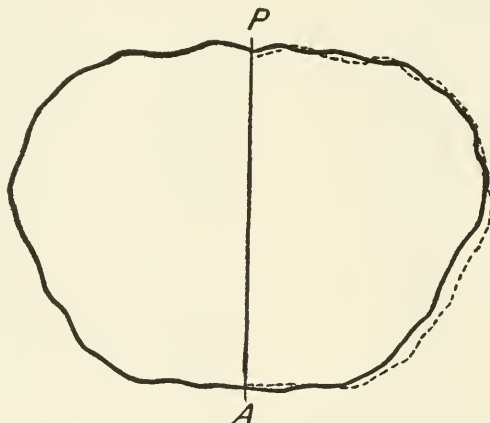


FIG. 2.—CYRTOMETRIC CURVE OF AN EMPHYSEMATOUS THORAX IN A MALE
AGED 71 YEARS. (EVANS.)

The dotted line shows a slight difference in the size of the right and left sides of the thorax.
A, sternum. P, spine.

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horizontal direction, the lower intercostal spaces are widened, the shoulders are raised, and the chest is enlarged in all its directions without being otherwise deformed.

Other deformities of the chest which may be classed as irregular are characterized by a loss of symmetry of its walls, an increase or diminution in one or more of its various diameters, and local flattening or bulging.

Flattening of the chest from before backward, with a proportionate increase in its transverse diameter, is usually associated with small lungs; it is a form of chest common in tuberculous subjects. Interference with the free admission of air to the lungs, from one

cause or another, and undue flexibility of the ribs are the most frequent causes of this deformity.

In the pigeon-breast of rickets the antero-posterior diameter

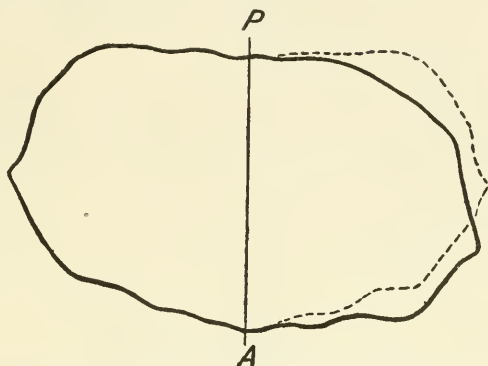


FIG. 3.—CYRTOMETRIC CURVE OF A TWISTED LEFT CHEST, IN A MALE AGED 31 YEARS, THE RESULT OF A FALL, TAKEN TEN YEARS AFTER RECOVERY. (EVANS.)

The dotted line shows the difference in the shape of the two sides of the thorax. A, sternum. P, spine.
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of the chest is markedly increased; the costal cartilages are very firm, while the ribs are abnormally soft and give way under the

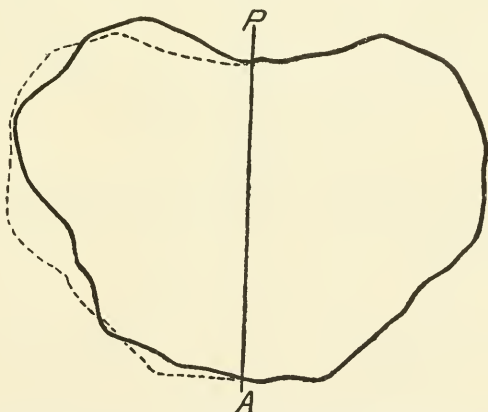


FIG. 4.—CYRTOMETRIC CURVE OF THE THORAX (AT THE LEVEL OF THE FOURTH RIB) IN TUBERCULOUS INFILTRATION OF THE UPPER AND MIDDLE LOBES OF THE RIGHT LUNG, IN A FEMALE AGED 26 YEARS. (EVANS.)

The dotted line shows the difference in the size of the right and left sides of the thorax. A, sternum. P, spine.
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combined force of atmospheric tension and inspiratory effort; so that the softest part of the ribs, which is near their sternal ends, is pressed inward, while the sternum is pushed forward by the unyielding costal cartilages.

Depression of a supra-clavicular fossa is the result of atrophic emphysema or of apical consolidation of lung.

Uniform dilatation of one side of the chest is due to the presence of fluid or air, or of both, in the pleural cavity, and to encephaloid carcinoma of the lung.

Uniform contraction of one side of the chest results from cirrhosis of the lung, chronic pulmonary tuberculosis, infiltrating carcinoma of the lung, chronic interstitial pneumonia, and condensation of lung due to long-continued pressure by fluid in the pleural cavity.

Localized dilatation or bulging is due to prominent or

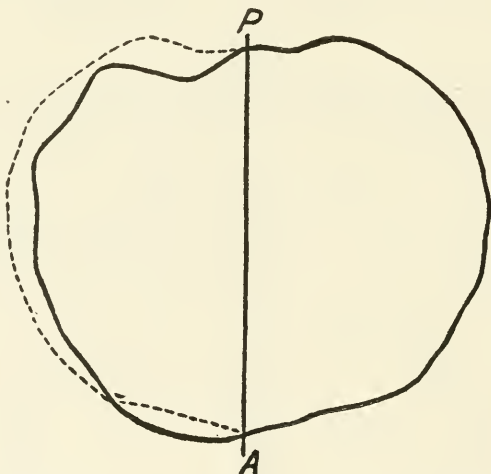


FIG. 5.—CYRTOMETRIC CURVE IN RETRACTION OF THE RIGHT CHEST (AT THE LEVEL OF THE FOURTH RIB) IN INTERSTITIAL PNEUMONIA, IN A FEMALE AGED 26 YEARS. (EVANS.)

The dotted line shows the difference in the size of the two sides of the thorax. A, sternum. P, spine.

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knuckled costal cartilages, localized emphysema, fluid in the pleural cavity, aneurism of the arch of the aorta, or of the innominate artery, enlargement of the heart, tumors, abscess, hydatids, etc.

Localized retractions of the chest are due to chronic inflammatory or congestive conditions of the apex of the lung, excavation of lung-substance, chronic thickening of the pleura resulting in contraction followed by retraction of the chest-wall, localized carcinomatous infiltration of lung-substance, etc.

Deformity of the thorax is very frequently due to lateral curva-

ture of the spine, as Loomis has stated. In angular curvature of the spine the antero-posterior diameter of the chest is increased in

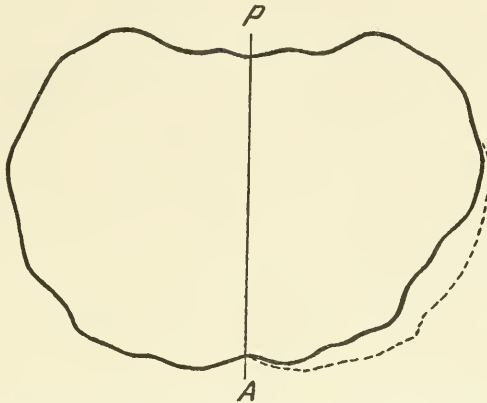


FIG. 6.—CYRTOMETRIC CURVE IN RETRACTION OF THE LEFT THORAX (AT THE LEVEL OF THE NIPPLES) TEN YEARS AFTER AN ATTACK OF PLEURISY, IN A BOY AGED 16 YEARS. (EVANS.)

The dotted line shows the difference in the size and shape of the thorax on the two sides. A, sternum. P, spine.

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proportion to the amount of destruction of the bodies of the vertebræ.

Undue softness of the costal cartilages leads to extreme depression of the lower part of the sternum.

Depression of the lower part of the sternum with a lessened

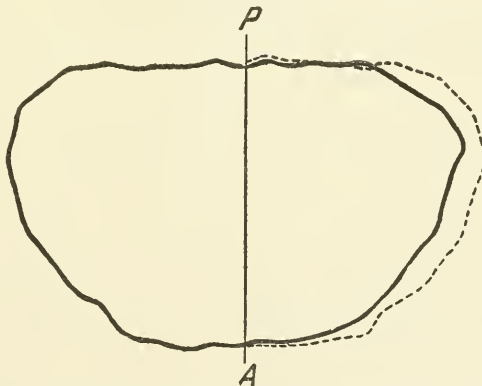


FIG. 7.—CYRTOMETRIC CURVE IN RETRACTION OF THE LEFT THORAX (AT THE LEVEL OF THE NIPPLES) EIGHT MONTHS AFTER AN ATTACK OF PLEURISY, IN A MALE AGED 37 YEARS. (EVANS.)

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antero-posterior diameter of the chest frequently occurs in children whose costal cartilages are normally quite soft, as a result of

complete or partial stenosis of some of the upper air-passages; this is due, in many instances, to the presence of morbid growths in the vault of the pharynx or nasal passages. Interference with the normal passage of air to the lungs, from any cause, leads to exaggerated action on the part of the respiratory muscles, and under such circumstances much of their force is expended on the walls of the chest. Moderate flattening of the upper part of the thorax may be due to what is called physiological atelectasis of the lung,—a condition generally associated with anæmia and occurring in young adults of sedentary habits.

Congenital deformities of the thorax are few in number; the most common of these are cleft sternum and defective formation

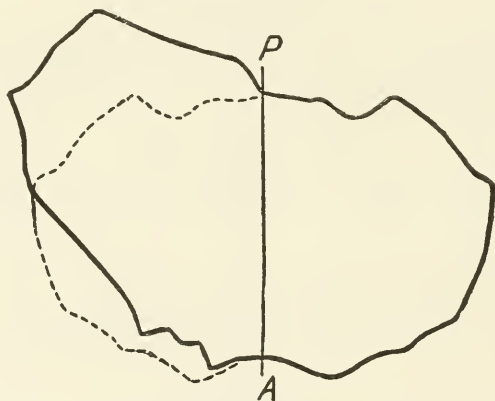


FIG. 8.—LATERAL CURVATURE OF THE SPINE. (EVANS.)

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of one or more ribs. Deformity of the chest may also be due to external pressure, caused by habitual malposition of the body, as in the depressed lower sternum of shoemakers, etc.

Prognosis.—In a study of tuberculous family history in relation to life-assurance, Lyon, of London, ⁶_{July 7, '94} has found that lives having a family history of pulmonary tuberculosis, even when selected, are below the average. Medical records contain no adequate data for determining the question of pulmonary tuberculosis in relation to life-insurance. Existing theories relating to the selection of lives having a family history of pulmonary tuberculosis are founded upon insufficient data.

As the records of insurance-offices contain the material for settling equitably the various questions belonging to this subject, it

is advisable that an inquiry should be made based upon these records, and conducted jointly by actuary and medical officer. After the extra risk accompanying the different varieties of tuberculous family history has been ascertained, it will remain for the medical officer, guided by these results, to use his discretion in dealing with individual cases according to their special features.

Prophylaxis.—At a meeting of the College of Physicians of Philadelphia, ⁹_{Feb. 10, '94} the following resolution was adopted after considerable discussion:—

“*Resolved*, That the College of Physicians believes that the attempt to register consumptives and to treat them as the subjects of contagious disease would be adding hardship to the lives of these unfortunates, stamping them as the outcasts of society. In view of the chronic character of the malady, it could not lead to any measures of real value not otherwise attainable.

“That strict attention on the part of physicians in charge of the individual cases, insisting on the disinfection of the sputum and of the rooms, on adequate ventilation, and on the separation of the sick from the well, as far as possible, will meet the requirements of the situation so far as they practically can be met, and better than any rules that, for diseases so chronic, can be carried out by a board of health.

“That the College of Physicians respectfully requests that no official action be taken in the matter by the Board of Health, except the insisting on disinfection of rooms in which consumptives have lived and died, in instances in which such procedure is not likely to have been adopted under the direction of the attending physician.”

In the course of the discussion, Osler, of Baltimore, offered the following propositions: 1. Following a primary law of parasitism, the bacillus tuberculosis frequents chiefly that organ in its host which communicates most freely with the exterior. Just as countless thousands of ova are thrown off from the intestine of the bearer of a tape-worm, so, from tuberculous lungs in a state of softening and cavity formation, countless millions of bacilli are cast out daily with the sputa. 2. The wide-spread diffusion of the parasite outside of the body has been demonstrated in the infectiveness of the dust and of the scrapings of the walls of rooms and wards occupied by patients with pulmonary tuberculosis. More-

over, the greater prevalence of tuberculosis in crowded communities, the enormous mortality from the disease in prisons and institutions, and its frequent occurrence as a house-malady suggest that the conditions favoring its continuance are those which foster the growth and spread of a specific contagion. 3. In the language of parasitology, the lungs constitute the chief seat of election. But, apart also from gross pulmonary lesions, the proportion of autopsies in which the bronchial glands are found tuberculous speaks unmistakably for direct infection in the exercise of their function as dust-filters.

On these grounds the registration of pulmonary tuberculosis would be beneficial,—enforcing attention to those sanitary details so apt to be slighted or overlooked, and diminishing directly the danger of contagion in the community.

Infection through food is closely related also to the endemic prevalence of tuberculosis. The incidence of the disease in the mesenteric glands of infants indicates that the gastro-intestinal canal is a portal of infection only a little less wide than that of the respiratory system.

The question of tuberculosis is not, however, settled with the disinfection of the sputa of tuberculous patients.

The hereditary transmission of the disease must be accepted, though an estimate of the frequency of this mode of infection must necessarily be uncertain; but for certain forms Baumgarten's theory of latency is particularly suggestive. Tuberculosis has been well called the *pébrine* of the human race. The analogy is striking, for not only is the parasite of the silk-worm disease transmitted by direct contagion, but it also infests the eggs, which hatch, and may pass through various stages of development before they are finally destroyed.

Lastly, and here is consolation, the conditions which render individuals more or less immune scarcely yield in importance to those which maintain the vitality of the tubercle bacilli in a community. So wide-spread is the seed that few of us escape infection, and the statistics of the Paris morgue show that in more than 50 per cent. of adults the germs not only gain an entrance, but actually effect a lodgment. As a factor in tuberculosis, the soil, then, has a value equal almost to that which relates to the seed, and in taking measures to limit the diffusion of the parasite let us not

forget the importance to the possible host of combating inherited weakness, of removing acquired debility, and of maintaining the nutrition at a standard of aggressive activity.

Upon the question of compulsory registration of cases of tuberculosis S. Solis-Cohen, of Philadelphia, ¹¹⁹_{Feb. 24, '94} sums up his views as follows: 1. The attending physician who is able to recognize a case of tuberculosis is equally able to instruct his patients as to all necessary precautions to prevent infection of others through them; and the patient who refuses or neglects to obey his physician's instructions will equally refuse or neglect to obey those of a health officer. Nor can a health officer enforce compliance except through proceedings that have not yet been authorized by law for the incarceration of refractory persons. 2. The forcible restraint and segregation of tuberculous persons are not warranted by established facts concerning the etiology of the disease. 3. Distribution of circulars by the Board of Health, independent of the attending physician, and perhaps containing statements and recommendations that he would not approve, is unwarranted and is likely to do mischief to the patient and to those about him; while for the supply to physicians of circulars of instruction for the use of patients, registration is not necessary. 4. Physicians who find themselves unable to cope with the conditions presented by certain patients and certain houses always have it in their power to report the facts to the Board of Health and to secure the benefit of all existing legislation. 5. If the object of registration is merely statistical, the discussion must be conducted on a different basis from that of the present agitation. Much might be said in favor of properly-guarded statistical reports; but as the case stands there is no argument in favor of compulsory registration, and, on the contrary, many against it.

Flick, of Philadelphia, ⁹_{Oct. 21, '93} suggests the following comprehensive scheme with a view to the suppression of tuberculosis: 1. Registration of all cases of the disease which have arrived at the breaking-down, or infectious, stage. 2. The education of the public at large, and of the people immediately concerned, as to the contagious nature of the disease, and how to avoid contracting it and how to avoid transmitting it to others. 3. The careful and thorough disinfection of all infected houses, penal and reformatory institutions, conveyances, and public places. 4. The establishment

of special hospitals for the treatment of the poor suffering from the disease. 5. Government inspection and regulation of dairies and slaughter-houses. 6. The enactment of laws and ordinances forbidding practices as a result of which others are liable to be infected. 7. The restriction and regulation of interstate and international emigration of persons suffering from the disease. 8. The retirement of all tuberculous patients in the infectious stage from occupations in which they can infect others, and the pensioning of those who cannot be maintained in hospitals.

Climatic Distribution.—Hinsdale, of Philadelphia, ⁹ Aug. 4, '94 describes a district partly within the State of New York and partly within Pennsylvania, comprising over 12,000 square miles, in which not more than one death occurs annually from pulmonary tuberculosis, in a population of more than 1000. This area includes the counties of Chautauqua, Cattaraugus, Allegany, Steuben, Chemung, Tioga, and Broome in New York, and McKean, Potter, Forest, Clarion, Elk, Cameron, Union, Sullivan, and Pike in Pennsylvania. In the southern tier of counties in New York the population is 62 to the square mile, and the inhabitants are engaged chiefly in agricultural pursuits. The soil is highly productive, and yields hay, oats, potatoes, grapes, and standing timber. The mean annual temperature in 1892 was $44\frac{1}{2}^{\circ}$ F. (7° C.). The rainfall has varied from 37 to 47 inches annually. The elevations vary from 860 to 1820 feet. The region is remote from the path of greatest frequency of storms. In the highlands of Pennsylvania adjacent to the New York border the country is wilder, the forests more extensive, the general elevation greater. It is cooler, drier, and more primitive; agriculture is not so remunerative; the industries are more prominently lumbering and mining for coal, iron, and oil. The climate is superb during the months of May, June, July, August, and September. It is distinctly bracing, with the sunshine of more southern latitudes. Cold weather usually sets in about November 1st and continues until the following April. Pleurisy and pneumonia are uncommon, and epidemics of diphtheria and scarlet fever are said never to occur.

Datzenko ⁵⁸⁶ ⁹ No. 44, p. 1209; Mar. 24, '94 relates some interesting observations upon pulmonary tuberculosis made in the course of a period of ten years in country practice. There were, in all, 87 cases,—24 from the better class and 63 from the peasantry. Of the former, 5

were cured, 6 died, 4 were improved, 6 remained unchanged, and in 3 the condition was aggravated; of the latter, 1 was cured, 29 died, 8 were improved, 14 remained unchanged, and in 11 the condition was aggravated. This marked disparity between the two classes of cases was due not only to hygienic and dietetic differences, but also to the fact that the peasants regarded the disease as incurable. The treatment employed was purely hygienic and dietetic. As much time as possible was spent in the open air, and a nutritious diet, including large quantities of eggs and milk, was insisted upon. Codliver-oil was given in addition. To several, creasote was administered in small doses. In the winter applications of cold water were made to the general surface of the body, and in the summer cold baths were taken. Medicines were only employed symptomatically. As a rule, improvement became manifest within a week of the institution of systematic treatment. Fever soon disappeared, and with it night-sweats; the anæmia diminished in intensity; the bacilli in the sputum became fewer in number, and the expectoration progressively less in amount; the physical signs indicated a sclerotic process in the affected structures, and at the end of a year the patient was greatly improved in appearance. Of the 6 cases in which a cure was brought about, 1 had presented induration of the lungs; 3, softening; 2, cavities. Etiologically, 3 of these gave the impression of having been infected by others; while in the remainder the transmission appeared to have been hereditary. All of the patients were young, between 14 and 24 years of age.

Treatment.—Mouisset²¹¹_{Oct. 1, '93} reports twelve cases of tuberculosis of various organs treated solely by overfeeding with raw beef and milk, in conjunction with a constant life in the open air. Those able to be about were out-of-doors. Those compelled to be in bed were placed in cots in a sunny pavilion. The general condition improved: temperature declined, weight increased, sputa diminished, and the color of the skin and mucous membrane became more healthy.

Schiess Bey and Kartulis⁵⁸_{Oct. 30, '93} report the treatment of 48 cases of tuberculosis by tuberculin, with better results than from any method previously employed. Injections were made three times a week. The initial dose was usually 0.0001 gramme ($\frac{1}{640}$ grain), which was gradually increased to 0.1 gramme ($1\frac{3}{4}$ grains).

Fifteen of the cases were surgical and 33 pulmonary; 16 were permanently cured. Schäfer²⁶_{Jan. 1, '94} reports the results obtained in 61 cases of tuberculosis treated with tuberculin: 29 were in the earliest stages, 23 at a more advanced period, whilst in 9 the condition was considered hopeless. Of the 52, 13 were greatly improved, 14 were improved, 7 remained stationary, 10 became worse, and 8 died. The 9 hopeless cases also died.

Bernheim, of Paris, ⁵⁹_{May 5, '94} has had encouraging results from the employment of injections of blood-serum from immune animals in the treatment of incipient pulmonary tuberculosis. He has treated about three hundred cases in this manner, with the result of obtaining at least a temporary cure, the period that had elapsed at the time of reporting being too short to permit the assertion that the cure was permanent and final.

As the result of the employment of potassium cantharidinate in the treatment of seventeen cases of pulmonary tuberculosis, Aynsley⁵⁵⁷_{Apr., '94} concludes that cases in the first stage are cured by this remedy, and also those in the second stage when the patient's stamina is good and there are no complications. In the third stage, when a large cavity is present, with hectic fever, emaciation, cough, and expectoration, so long as the patient is kept in good condition, the bacilli disappear or are but faintly stained, there is gain in weight, cough and expectoration diminish, and the temperature settles down. If the patient go out, however, and is exposed to cold, etc., the pulmonary destruction continues. The mixture employed for injection consists of: cantharidin, 1 grain (0.065 gramme), and potassic hydrate, 2 grains (0.13 gramme), to which are added 11 fluidounces, 5 fluidrachms, and 20 minims (362.8 grammes) of distilled water. At the outset 4 or 5 minims (0.26 or 0.32 gramme) were injected twice a week, the amount being gradually increased to 15 minims (1 gramme).

Audéoud²⁰³⁰_{'93} will not concede specific or antibacillary properties to creasote in the treatment of pulmonary tuberculosis, but maintains its action to be one of substitutive irritation. The treatment should be continued uninterruptedly for several months, at the same time without neglecting accessory indications for general treatment. The drug acts best in chronic or subacute tuberculosis of apyretic type, while hæmoptysis is not a contra-indication. Both children and the aged seem to bear the remedy

well. It is contra-indicated in acute, florid cases of febrile type, in tuberculous pleurisy and enteritis, in the presence of symptoms of nephritis, and when an idiosyncrasy to the drug exists. Topical applications of creasote exert a favorable influence upon tuberculous laryngitis. The remedy may be administered by enema for a number of months without producing intestinal derangement, and this mode of administration may be considered the preferable one. Weiss¹⁶⁹_{Mar., '94} admits that creasote is not a direct specific for tuberculosis, but contends that by diminishing abnormal secretion and acting as a stomachic it indirectly influences the morbid process in the lung. He maintains that it is the best remedy at present available in the symptomatic treatment of pulmonary tuberculosis. Burlureaux¹⁰⁰_{June 18, '94} employed creasote in 300 cases of pulmonary tuberculosis under prolonged observation, with the following results: In 15 favorable, in 92 encouraging, in 115 good, in 32 moderate, and in 46 no effect. The dose is to be gradually increased to the point of tolerance. Blanchard, of Geneva,²²_{Nov. 8, '93} reports seventeen cases of latent pulmonary tuberculosis completely and rapidly cured by the administration of creasote per rectum. Each enema contained 5 drops of creasote suspended in olive-oil, the yolk of an egg, and half a pint (250 grammes) of warm water, the dose of creasote being gradually increased to 40 drops daily. No other medication was employed.

Simon²⁰³¹_{'94}; ¹⁴_{Sept. 16, '94} recommends the employment of suppositories of creasote in the treatment of tuberculosis. The following formula may be employed: \mathcal{R} Pure beech-wood creasote, 0.50 to 1 gramme ($7\frac{3}{4}$ to $15\frac{1}{2}$ minims); cocoa-butter, 5 grammes ($1\frac{1}{4}$ drachms). Mix. S. Solis-Cohen, of Philadelphia,¹¹⁹_{July 14, Sept. 29, '94} recommends the following formula in the treatment of cases presenting evidences of breaking down of tissue, or of catarrhal processes in any portion of the air-passages, or in which there is continuous elevation of temperature or intermittent or remittent fever, exceeding 99.5° F. (37.5° C.): \mathcal{R} Creasoti (beech-wood), 30 to 80 minims (2 to 5.30 grammes); tinct. cardamomi, 4 fluidrachms (16 grammes); glycerini, 2 fluidounces (62 grammes); alcoholis, q. s. ad 4 fluidounces (124 grammes). Mix. Sig.: Two teaspoonfuls in water after meals. Note: To the glycerin add the creasote, then the tincture of cardamom and alcohol.

The smaller dose of creasote is used at first, and the quantity gradually increased until 5 drops, four times a day, are reached as a maximum. In certain cases of pulmonary tuberculosis, in which it is desired to act upon the heart, in order to improve the pulmonary and general circulation and to stimulate the bronchial mucous membrane and respiratory tract in general, the following combination will prove useful: \mathcal{R} Benzoyl guaiacol, 1 drachm (4 grammes); powder of digitalis, 3 grains (0.2 gramme); eucalyptol, 24 minims (1.5 grammes); extract of gentian, q. s. Mix. Make twelve capsules. Sig.: One capsule four times a day. The following formula is of much benefit as a tonic nutrient in the early stages of pulmonary tuberculosis in anæmic and scrofulous subjects, and in the prevention of the development of tuberculosis in predisposed persons worn out by nursing relatives in the last stage of this disease or otherwise run down in health: \mathcal{R} Tincture of ferric chloride, 2 fluidrachms (8 grammes); dilute phosphoric acid, 3 fluidrachms (12 grammes); Churchill's syrup of the hypophosphites, q. s. ad 3 fluidounces (93 grammes). Mix. Sig.: Two teaspoonfuls in a tablespoonful of water, after meals, thrice daily. If softening have already taken place, a few drops of creasote may be added to the dose. Inhalations of compressed air and systematic overfeeding must likewise be employed if it is desired to bring about a recovery. The following is recommended by Maximowicz¹¹³_{No.10,'94}: \mathcal{R} Creasoti, alpha-naphthol, each 2 drachms (8 grammes); acidi arseniosi, 2 grains (0.13 gramme); strychninæ nitrat., 1 grain (0.065 gramme); atropinæ sulphat., $\frac{1}{6}$ grain (0.01 gramme); extracti gentianæ, gummi arabic., āā q. s. ut ft. pil. no. exx. Mix. Sig.: One from four to six times daily. Chaumier, of Tours, recommends creasote carbonate, or creasotal, in doses of from 20 drops to 1 drachm (4 grammes) daily to children, and from 2 to 4 drachms (8 to 16 grammes) to adults, in teaspoonful doses. The appetite improves, the strength increases, the cough diminishes, and the pulmonary lesions recede. Iutz⁵¹_{Dec., '93; Feb.3,'94} reports successful results from the employment of salol in the treatment of pulmonary tuberculosis. He administers about $1\frac{1}{2}$ drachms (6 grammes) daily in single doses of from 20 to 30 grains (1.3 to 2 grammes). The drug appeared to lessen disintegration of tuberculous material, and the good effects of treatment are ascribed to the favorable influence exerted upon the secondary infection.

Smith, of Binghampton, N. Y., ⁵⁹_{July 21, '94} has employed hydronaphthol hypodermatically in the treatment of 31 cases of pulmonary tuberculosis at all stages, with 9 deaths and 14 recoveries; while 8 were restored to fair health, but were admitted to be incurable. He employs a solution of 5 grains (0.32 gramme) to the drachm (4 grammes). In the course of treatment hectic fever disappears, appetite returns, cough lessens, the lungs clear, and the patient gains in weight.

Simanowsky ¹¹⁶_{July, '94} has employed ortho-chlorphenol and para-chlorphenol in the treatment of tuberculous processes of the upper air-passages and in hyperplastic conditions and chronic swellings of the mucous membrane, using 5-, 10-, and 20-per-cent. solutions in glycerin or pure melted para-chlorphenol. The affected areas are either painted by means of a brush or a cotton swab, or the solution is injected by means of a laryngeal syringe. The application is followed for a short time by burning and pain; so that in the case of sensitive individuals the treatment may well be preceded by an application of a 10-per-cent. solution of cocaine hydrochlorate.

Jay ²⁰³¹_{'94} ¹¹_{July, '94} injects, once or twice a day, 5 cubic centimetres ($1\frac{1}{4}$ fluidrachms) of an oily solution of menthol (1 to 20) by means of a laryngeal syringe introduced into the trachea.

After an experience with more than one hundred cases of pulmonary tuberculosis during a period longer than two years, Cohn, of Hamburg, ⁶⁹_{No. 14, '94} ⁹_{May 19} recommends the administration of ammonium sulphichthylate, mixed with an equal part of water, in doses of from 4 to 40 drops thrice daily. The drug is best given in a generous quantity of water before meals, and the dose is increased gradually 1 drop of the mixture daily. It may also, though not with the same advantage, be given in pill form or by inhalation.

Foxwell ³²_{May, June, '94} reports the results obtained in 46 cases treated with iodoform, of which careful notes had been kept: 12 were much improved, 15 improved, in 11 the condition remained unchanged, and 8 grew worse. The drug appeared to act as well in advanced cases as in early ones. The usual prescription was a 1-grain (0.065 gramme) pill, to be taken six times daily. Subsequent experience, however, showed that, when the remedy was well borne, the dose could be increased by 2 grains

(0.13 gramme) every other day until 30 grains (2 grammes) were reached. The patient should be kept at this dose for at least three months and, should all signs of activity have vanished, at a somewhat lower level for another three months. A continuance for six months longer is generally not without benefit.

Bernardinone, of Naples, ⁵⁸⁹_{No. 260, '94} has employed aristol in progressively-increasing doses up to 1.5 grammes (24 grains) daily, and in increasing concentration up to 15 per cent., in the treatment of various forms of tuberculosis, with satisfactory results in cases not too far advanced.

Taylor, of London, ⁶_{Sept. 8, '94} has employed aniline sulphate in the treatment of tuberculous patients. Bronowski ^{520 109}_{No. 13, '94; June} has used methylene blue in eight cases, in doses of 2 or 3 grains (0.13 or 0.2 gramme), in wafers three times a day. It was found to lower the temperature in febrile cases and to diminish the night-sweats. The drug is especially serviceable at an early stage of the disease.

Gessler ¹³³_{Sept. 8, '94} indorses the employment of ozone in the treatment of pulmonary tuberculosis, the gas being generated by means of a static machine. Ten cases at various stages of the disease were thus treated, with distinct improvement in nine. Cases attended with fever should be excluded. The duration of treatment averaged three months. The inhalations were practiced daily at first for a period of five minutes, subsequently for from fifteen to twenty.

Sendziak, of Warsaw, ^{520 26}_{No. 7, '94; Apr. 2} has employed thiosinamin in 11 cases of tuberculosis,—10 of the laryngeal and pulmonary type and 1 of nasal lupus. He concludes that the remedy administered subcutaneously may occasionally exert a favorable influence upon tuberculous processes in the larynx. He failed to observe any beneficial influence upon the process in the lungs, but rather the contrary. There was no general improvement. It is conceded that the drug might prove useful in cases of lupus. As a rule, it did not give rise to general reaction. The injections were attended with considerable pain.

Landerer, of Leipzig, ¹¹⁶_{Feb., '94} reports the treatment of 84 cases by intra-venous injections of cinnamic acid. Of 33 cases of chronic pulmonary tuberculosis without demonstrable cavities, all were cured. Of 22 cases with cavities, but without marked fever, 2 died, while the results could not be ascertained in the remainder.

Of 8 cases presenting cavities with continuous high fever, 6 died. Of 15 cases of florid tuberculosis, 8 died; 2 remained cured after two years, 1 after three months; the remaining 4 were in a precarious condition. Two cases of intestinal tuberculosis, 1 of tabes mesenterica, and 2 of mediastinal tuberculosis were all cured. A case of genito-urinary tuberculosis was considerably improved. A 5-per-cent. emulsion with almond-oil, yolk of egg, and common salt in solution was employed, and also a 5-per-cent. aqueous solution of sodium cinnamate. The quantity injected should vary with the condition of the patient. As a rule, from 0.1 to 0.4 cubic centimetre ($1\frac{3}{4}$ to 6 minims) was used about twice weekly. When possible the intra-venous treatment was supplemented by a local one, the acid being dissolved in glycerin or alcohol 1 to 20 or 1 to 10.

Lancereaux ²²_{Feb. 7, '94} recommends the administration of substances that produce succinic acid in the organism, such as raw meats, fats, benzoic acid, carrots, green vegetables, etc. The good results are ascribed to the antiseptic properties of the acid.

Linn, of Nice, ⁷¹_{Aug., '94} quotes the employment by Gaube of the following injection in the treatment of pulmonary tuberculosis: R; Pure calcium chloride, 88.62 grammes (1329 grains); pure magnesium chloride, 29.54 grammes (458 grains); pure sodium chloride, 6.84 grammes (103 grains); phosphoric acid, 0.09165 gramme ($1\frac{1}{2}$ grains); casein, 0.35 gramme ($5\frac{1}{2}$ grains); distilled water, 1000 grammes (1 quart). The solution should be filtered and sterilized, 2 cubic centimetres (31 minims) being injected every other day on the posterior aspect of the chest. The injection should be withheld as soon as physiological effects appear, to be resumed after these have disappeared. Potain ³¹_{Aug. 29, '94} prefers quinine sulphate and tannic acid, the latter in doses of from 5 to 6 grammes ($1\frac{1}{4}$ to $1\frac{1}{2}$ drachms) a day for acute cases.

Strizower ⁸_{No. 3, '94} recommends inunctions of mercurial ointment. One-half drachm (2 grammes) of the ointment is rubbed into the skin daily, and a warm bath is taken after every fourth inunction. It is not claimed that the treatment is infallible or universally applicable. In cases in which it fails to do good, however, it at least does no harm.

Luton, of Reims, ²¹²_{Apr. 25, '94} favors the employment of the salts of copper in the treatment of pulmonary tuberculosis. These he

uses in the form of lotions, ointments, bougies, collyria, pills, and powder,—externally, internally, and by hypodermatic injection. Appended is a collection of formulæ :—

For external use :

LOTION.

R Cupri acetat., 1.00 grm. (15½ grains).
 Aquæ destillat., 1000.00 grms. (1 quart).
 M. ft. sol.

OINTMENT.

R Cupri acetat., 0.03 grm. (½ grain).
 Vaseline., 30.00 grms. (1 ounce).—M.

COLLYRIUM.

R Cupri acetat., 0.01 grm. (⅙ grain).
 Aquæ destil., 20.00 grms. (5 fluidrms.).
 M. ft. sol.

For internal use :

POTION.

R Cupri acetat., 0.03 to 0.05 grm. (½ to ⅞ grain).
 Mucil. acacie, 124.00 grms. (4 ounces).
 M. Sig. : A teaspoonful hourly on an empty stomach.

R Cupri acetat., 0.05 grm. (⅞ grain).
 Sodii phosphat., 0.50 grm. (7¾ grains).
 Mucil. acacie, 125.00 grms. (4 ounces).
 M. Sig. : A teaspoonful hourly on an empty stomach.

PILLS.

R Cupri acetat., 0 10 grm. (1¾ grains).
 Ext. jugland., 0.50 grm. (7¾ grains).
 M. ft. pil. no. x.
 Sig. : One or two a day.

R Cupri acetat., 0.10 grm. (1¾ grains).
 Sodii phosphat., 0.50 grm. (7¾ grains).
 M. ft. pil. no. x.
 Sig. : One or two a day.

POWDER.

R Cupri acetat., 0.10 grm. (1¾ grains).
 Acid. tannic., 2.50 grms. (38 grains).
 M. ft. cachet. no. x.
 Sig. : One daily on an empty stomach.

For hypodermatic injection :

COLLOID COPPER PHOSPHATE.

R Sodii phosphat., 5.00 grms. (1¼ drachms).
 Aquæ.,
 Glycerin., āā 30.00 grms. (1 fluidounce).—M.

R Cupri acetat., 1.00 grm. (15½ grains).
 Aquæ,
 Glycerin., āā 20.00 grms. (5 fluidrms.).—M.

Mix the two solutions without filtering.

One gramme (15½ minims) of the mixture corresponds to 0.01 gramme ($\frac{1}{10}$ grain) of copper acetate.

CUPRIC SERUM.

R Sodii phosphat., 5.00 grms. (1¼ drachms).
 Sodii sulphat., 10.00 grms. (2½ drachms).
 Aquæ destil., 90.00 grms. (3 fluidounces).—M.

R Cupri acetat., 0.20 grm. (3 grains).
 Aquæ destil., 10.00 grms. (2½ fluidrms.).—M.

Mix the two solutions.

Five grammes ($1\frac{1}{4}$ fluidrachms) of the mixture represent 0.01 gramme ($\frac{1}{10}$ grain) of copper acetate ; 1, 2, 3, 4, or 5 grammes ($\frac{1}{4}$ to $1\frac{1}{4}$ fluidrachms) may be injected.

AMMONIACAL COPPER ACETATE.

R Cupri acetat., 1.00 grm. (15½ grains).
 Aquæ destil., 100.00 grms. (3¼ fluidounces).—M.

Add pure ammonia, drop by drop, until disappearance of the precipitate that first forms, at the same time avoiding an excess of ammonia ; 1 gramme (15½ minims) represents 0.01 gramme ($\frac{1}{10}$ grain) of copper acetate.

PHOSPHATED WINE OF WALNUT.

R Vini Malagæ, 1000 00 grms. (1 quart).
 Sodii phosphat., 30.00 grms. (1 ounce).
 Ext. jugland., 15.00 grms. (3¾ fluidrms.) ;
 or, Tinct. jugland., 60.00 grms. (1¾ fluidounces).

M. Sig. : A wineglassful at each meal.

Thomas ^{2031 67}_{94 ; Sept.15} treated fifteen cases of tuberculosis with ether and opium. Every twenty-four hours 0.01 or 0.02 gramme ($\frac{1}{10}$ or $\frac{1}{5}$ minim) of sulphuric ether was given by intra-muscular injection, together with from 0.10 to 0.20 gramme ($1\frac{3}{4}$ to 3 grains) of opium. As a rule, an injection of 1 cubic centimetre (15½ minims) of ether was given in the morning and 2 pills of 0.05 gramme ($\frac{7}{8}$ grain) of extract of opium at night. In aggravated cases the morning injection of ether may equal 2 cubic centimetres (31 minims), and this may be repeated at night, while pills containing 0.01 gramme ($\frac{1}{10}$ grain) of extract of opium, or the same amount in solution, may be given every two hours during the day. During the course of the night one may give, besides, 0.20 gramme (3 grains) of Dover's powder, in several doses. In debilitated subjects the following formula may be employed : R Extract of opium, $\frac{5.0}{100}$ part ; spiritus ætheris nitrosi, 20 parts ; julep gommeux, 120 parts. Mix. Sig. : From 4 to 8 teaspoonfuls daily. The good effects of this plan of treatment usually show themselves in the course of

from four to ten days by cessation of night-sweats, increase in strength, and improvement of appetite. Later on, expectoration and dyspnoea diminish, and ultimately the bodily weight increases. Coarse mucous râles disappear, the respiratory rhythm becomes regular, and the physical signs due to enlargement of the bronchial glands and the existence of cavities subside. The treatment is especially indicated in cases in which softening and supuration are prominent. It is likewise not without a favorable influence upon extra-pulmonary lesions. It may profitably be combined with other therapeutic measures.

Brewer, of Chicago, ¹⁸⁶_{Apr., '94} records three cases of pulmonary tuberculosis, in which thorough inoculation with vaccine virus was followed by speedy remission of pre-existing symptoms. Crocq ⁵⁷_{No. 21, '94} recommends the administration of ergot or ergotine. The former may be given in the form of the fluid extract, in doses of from $\frac{1}{2}$ drachm to 1 drachm (2 to 4 grammes) or more, and the latter in doses of from $\frac{1}{2}$ grain to 4 grains (0.03 to 0.26 gramme) or more, several times daily. Not only is hæmoptysis thus controlled, but expectoration is diminished, the sense of oppression is relieved, and the general condition is improved. Goldendach, of Moscow, ⁶⁹_{June 28, '94} obtained good results from the employment of from 5 to 10 grains (0.32 to 0.65 gramme) of powdered ergot at bed-time for the control of night-sweats. The same results may be secured by the administration of ergotine. The following formula is given: R_x Extract of ergot, 3 parts; dilute alcohol, glycerin, and distilled water, of each, 5 parts. Of the solution 15 minims (1 gramme) are injected at night subcutaneously. The same mode of treatment was recommended fourteen years ago by Da Costa, of Philadelphia. He at first employed the fluid extract of ergot, but subsequently ergotine, in doses of 2 grains (0.13 gramme) three or four times daily.

Conkling, of Brooklyn, ¹⁵⁷_{July, '94} details the results of a carefully-conducted series of observations upon the efficacy of certain drugs in the treatment of the night-sweats of pulmonary tuberculosis. Aromatic sulphuric acid was found at times useful. It was given in simple or in sweetened water, in the dose of 10 or 15 minims (0.65 or 1 gramme) at bed-time, or in three doses of from 7 to 10 minims (0.45 to 0.65 gramme) each late in the afternoon, early in the evening, and at bed-time. The second method was found

the better. The remedy could not be used for long periods of time. It frequently induced constipation, and to some degree interfered with other lines of treatment. Camphoric acid, given in doses of 30 grains (2 grammes) in water at bed-time, was found very uncertain in action. Chloralamid, in doses of 30 or 35 grains (2 or 2.3 grammes), was a more valuable remedy. Muscarine, given in doses of $\frac{1}{60}$ grain (0.0011 gramme) at bed-time, was the least successful of all the remedies used. Zinc oxide, in doses of $2\frac{1}{2}$ grains (0.16 gramme), in pill at bed-time, controlled the sweating in two-thirds of the administrations. Agaricine in pill form, in doses of $\frac{1}{12}$ grain (0.005 gramme) at bed-time, or given late in the afternoon and repeated in four or five hours, was the most successful of all the drugs used. Atropine, in doses of $\frac{1}{60}$ grain (0.0011 gramme) or less, and tincture of belladonna, in doses of from 7 to 10 minims (0.45 to 0.65 gramme), two or three times in the latter part of the day, gave disappointing results.

Having in view the reduction of the pressure in the pulmonary circulation, Pal, of Vienna,¹⁶⁹ July, '94; July 21⁹ employed chloral hydrate, in doses of from 15 to 37.5 grains (1 to 2.43 grammes), by enema, in the treatment of the hæmoptysis of pulmonary tuberculosis, selecting young adults with healthy hearts. In some cases the hæmorrhage would cease or diminish in from half to three-fourths of an hour, sometimes recurring after a varying interval. In a number of instances the administration of the drug was repeated, sometimes in a prophylactic way, even after the hæmorrhage had ceased. Morphine and codeine may be expected to act with correspondingly good results, and morphine has the additional advantage of subduing cough. Daremberg³⁸³ V.38, No.3 recommends, in addition to the usual measures employed, the application of ice to the testicles or the labia majora. A sudden, painful, temporary sense of pressure is felt, and the hæmorrhage ceases. Should the bleeding recur, the application may be made twice daily or continued for five minutes at a time.

Having observed that laborers about the petroleum-wells of Roumania were free from pulmonary tuberculosis, Pellissier⁶⁷ May 15, '94; July 21⁹ was led to use filtered crude petroleum, administered in capsules, in the treatment of the cases of pulmonary tuberculosis that came under his care during a period of two years, and describes the results as surprising. The cough soon ceased, then the sweats;

appetite and sleep were restored; the pulmonary lesions receded; the breath smelled strongly of petroleum, but the digestion was not deranged. The patients were also made to breathe air that had been passed through petroleum. Administration of petroleum by the rectum was tried, but proved unsuccessful.

Shurley, of Detroit, ⁶¹_{Aug. 26, '93} discusses the treatment of pulmonary cavities by the insertion of a rubber tube and the injection of chlorine-gas. The diluted chlorine is obtained by pumping air with a common rubber bulb through a Wolff bottle previously filled with the gas and connected with a drainage-tube introduced into the cavity. From 12 to 15 bulbfuls may be thus introduced and the operation repeated from every two to four hours. The manipulation was attended with very little uneasiness, in his hands, and was followed by little or no cough; indeed, it seemed to exercise a soothing influence. The cavity should be opened near the apex without resecting the ribs, the galvano-cautery being used in cutting through the lung. If the layers of the pleura are not adherent, it is inadvisable to proceed farther.

Forlanini, ⁹⁹⁷_{Nos. 20, 21, '94} has endeavored to treat pulmonary tuberculosis by the establishment of an artificial pneumothorax. Between 200 and 250 cubic centimetres of filtered air were injected into the pleural space and the opening closed. The operation was repeated on successive days until the pneumothorax reached a decided volume. The procedure was unattended with complications. The oxygen of the introduced air was rapidly absorbed, the nitrogen not so rapidly; so that in subsequent experiments only filtered nitrogen was employed. Pleural adhesions formed and limited the extension of the pneumothorax. The physical signs were locally improved, but the process extended to other parts.

Noble Smith ²_{Oct. 21, '93} describes a method of mechanically expanding the thorax and of permanently enlarging the aërial capacity of the lungs as an adjunct in the treatment of pulmonary tuberculosis. By means of soft shoulder-straps the shoulders are drawn backward to a pad placed centrally between the scapulæ and permanently held in this position. The central pad is kept at the level of the shoulders, thus affording a somewhat upward support, by carrying a light steel rod down the back to the level of the seat, there to be maintained by a pelvic belt. By this means there

results a tendency in sitting for the spine to project backward, and in standing for the abdomen to sink forward, causing a condition of lordosis. To obviate this a pad is placed in the centre of the back to prevent the backward projection in sitting, and the belt is placed in front of the abdomen to limit its projection while the patient is standing.

PNEUMONIA.

Etiology.—Herringham, of London, ^{May 12, '94} has made a study of all cases of acute croupous pneumonia in patients over 5 years of age admitted during the year 1893 to Guy's Hospital, the London Hospital, St. Thomas's Hospital, and St. Bartholomew's Hospital. From January 1st to March 25th the average number of cases in two weeks was a little over 30; during April, May, and June the average was 62; from July 1st to October 21st, $27\frac{1}{2}$; and during the remaining ten weeks, 16. It appeared that the time of greatest prevalence of the disease corresponded with the period in which the daily range of temperature was wide in conjunction with a low relative humidity. It was almost exactly coincident with the east winds.

Thornton, of Margate, ^{July 21, '94} reports three cases of pneumonia in a mother, son, and daughter in a single household within a period of fourteen days. The mother and son died. Three other members of the family, in robust condition, escaped. The sanitary conditions of the house in which the family lived were bad. Boyce, of Emlenton, Pa., ^{161 May, '94} observed a case of pneumonia in a boy of 17 years, who was nursed by a brother. On the fourth day the latter had two severe chills preceding the development of a left-sided lobar pneumonia. The mother, who nursed both the boys, was shortly afterward seized with a chill followed by pneumonia. The second child succumbed, the others recovered. Campbell, of Montreal, ^{282 Mar., '94} reports three cases of pneumonia in a mother and two children, all of whom recovered, although one of the children developed empyema. The second case occurred two days after the first, and the third three days after the second. Daly ^{6 Aug. 11, '94} describes a fatal case of pneumonia in a man, 63 years old, who was nursed night and day by his wife. On the day of his death the wife was seized with acute bilateral pneumonia and died after two days' illness. Several days later the medical attendant

developed an attack of acute pneumonia, which also terminated fatally.

Wassermann, of Berlin,⁶⁹_{Nov. 23, '93} describes forms of pneumonia due to streptococci and the bacilli of influenza, respectively. Pneumonia of streptococcal origin may be primary or secondary. The disease pursues a subacute or chronic course, and at times closely resembles tuberculosis, the diagnosis only being possible by the injection of tuberculin. The symptoms usually include an indisposition to work, diminished energy, alternation of heat and cold, pains in the chest, irritative cough, often night-sweats, emaciation, and scanty expectoration. The localization of the disease is a variable one, and the morbid process invades the apices with relative frequency. The prognosis is reasonably favorable. The treatment should be directed to the elimination or neutralization of the causative factor. For this purpose inhalations of ethereal oils or concentrated solutions of ether and camphor have brought about most satisfactory results. In the case of pneumonia due to influenza bacilli the sputum is frothy and purulent and not streaked with blood. The febrile curve is irregular and defervescence occurs by lysis. A striking feature is the long-delayed resolution. It is possible for true croupous pneumonia and the pneumonia of influenza to be simultaneously present in the same individual.

Grube, of Neuenahr,⁶⁹_{Nov. 23, '93} inclines to the view that a specific form of pneumonia occurs in gouty persons, and reports two illustrative cases. Both occurred in individuals with hereditary predisposition to gout, and who had themselves suffered from attacks. In the one the illness terminated by gouty inflammation of the testicles and subsequent pains in the lower extremities; in the other, by the development of a typical attack of gout in the left foot. Examination of the sputum in the second case disclosed the presence of uric acid.

Paterson⁶_{Jan. 20, '94} reports five cases in which pneumonia followed external violence, three of the cases terminating fatally. The first occurred in a man, 47 years old, who had slid down a hay-rick, striking his left side violently against a cart standing below. Symptoms of pneumonia soon appeared, and death took place twenty-seven days later. On post-mortem examination a separation of the eighth and ninth ribs from their cartilages at the site of injury was found, with complete consolidation of the lower lobe

of the corresponding lung. There was no evidence of bruising and no signs of injury to the lung, and the pleura at the seat of separation was perfectly free. The second case was in a man, 52 years old, who stumbled and fell, striking his right shoulder forcibly; symptoms of pneumonia made their appearance in a short time, and death took place eighteen days afterward. At the autopsy a moderate amount of fluid was found in the pericardial cavity, and there were other evidences of recent pericarditis. There was uniform recent adhesion of the pleura over the upper and middle lobes of the right lung, and below this a pint and a half ($\frac{3}{4}$ litre) of turbid serum. The upper and middle lobes and a narrow strip along the border of the lower lobe were consolidated. On the left side the upper lobe was in a state of red hepatization, the lower half being deeply congested and œdematous. The third case was in a man, 66 years old, who fell, striking the left side on the edge of a pavement and shaking himself considerably. In a short time left-sided pneumonia developed and terminated in recovery. The fourth patient was a teamster, 38 years old, who was struck upon the left side of the chest, over the lower ribs, by the centre-pôle of a wagon. Several days later left-sided pneumonia developed. The physical signs were more marked over the seat of the injury than elsewhere. The case terminated in recovery. The fifth case was in a man, 38 years old, on whom a quantity of earth fell while digging in a pit, throwing him down and severely bruising the right side. In the course of three days symptoms of right-sided pneumonia developed, and death took place from heart-failure and pulmonary œdema. Upon post-mortem examination the right lung was found completely consolidated, and considerable lymph was present upon the pleura, while at the base there were some recent adhesions. There were no marks of a recent injury, and the ribs were intact. Génin reports a case of pneumonia following a fall, with injury to the right side of the chest, occurring in a man 21 years old, previously in good health, and terminating in recovery.

Bacteriology.—Reed, of the U. S. Army, ⁷⁶⁴_{Mar., '94} reports a fatal case of croupous pneumonia, in a soldier 28 years old, in which, in cover-slip preparations made from the affected pulmonary tissue, the proteus vulgaris was found, in addition to the diplococcus lanceolatus. Leudet ²⁰³_{Oct. 1, '93} relates a fatal case of pneumonia, in a

woman 40 years old, presenting symptoms of general infection, and in which, after death, it was possible to isolate the bacterium coli commune from the hepatized lung, the spleen, kidneys, liver, and gall-bladder.

Berlioz, of Grenoble, ⁶_{June 16, '94} found in the blood, spleen, and liver, in a case of concomitant pneumonia and hæmorrhagic pleurisy, a bacillus from 4 to 6 μ long and 1 μ thick, which he believes to be the specific cause of the morbid conditions. Ovoid spores develop in culture, both bacilli and spores being non-motile. They are easily stained with aniline colors, especially gentian-violet. They develop readily in the usual culture-media and liquefy gelatin. The organism possesses great vitality and displays great resistance to the action of antiseptic agents. It proved pathogenic for guinea-pigs, inducing broncho-pneumonia and hæmorrhagic pleurisy.

Pathology.—Ribbert, of Bonn, ⁵³_{B. 12, No. 10, '94} summarizes the results of recent observations made by himself and his pupils in regard to the pathology of pneumonia. It was found that in croupous pneumonia the exudate has a lobular arrangement, the bronchioles and adjacent alveoli containing principally a cellular exudate and the more remote alveoli a fibrinous exudate. The infundibular passages contain principally cells, and neighboring alveoli fibrin. Croupous pneumonia thus differs from so-called catarrhal pneumonia in its diffuse distribution, and the inference is therefore drawn that infection takes place by the bronchial passages. The slighter the exudation of fibrin, the larger the number of cocci present; and the more active the fibrinous exudation, the smaller the number of cocci. These organisms are found predominant in the central alveoli, where the cellular exudate is most marked. In tuberculous lungs an exudation of fibrin is not infrequently found in the alveoli at the periphery of the lobule, and this condition cannot be ascribed exclusively to secondary infection, but to the tubercle bacilli must be conceded the property of inducing exudative inflammation through their toxic products. Pneumonic processes are also attended with coagulation within the blood-vessels, in the form of fibrinous thrombi, and within the capillaries. The anæmic condition of hepatized portions of lung favors the disintegration of the exudate, and thus also its absorption, and, by preventing access of oxygen, leads to the destruction of the

cocci. This last process is also hastened by phagocytosis. In some cases the cocci were exclusively found inclosed in wandering cells. The uniform duration of croupous pneumonia is due to the fact that the cocci possess, in general, a similar vital energy, and thus die at regular intervals. In the development of indurative processes, it has been shown that the connective-tissue columns pass through the walls of the alveoli and do not arise from these. This hyperplasia originates especially in the walls of the smaller bronchi, following the lumen of the bronchial tubes downward, and thus reaching the alveoli.

Reiche, of Hamburg,⁶⁹ Jan. 11, '94 reports the results of an examination of the kidneys in forty fatal cases of uncomplicated pneumonia in adults. In 60 per cent. in which albuminuria of low degree was present during life, renal changes were invariably found, varying in intensity and extent, but almost always involving the cortical epithelium. In a large number plasmolytic processes predominated, in the minority coagulation-necrotic processes. The interstitial tissue was only exceptionally affected, and always in slight degree. Exudates were always present in Bowman's capsule, often of a simply granular character and often admixed with cells of varying kind. Tube-casts were found with relative frequency. Of twenty-four cases in which pneumococci were sought for in the kidneys, they were found in all but four, though generally not numerous.

Rivalta,¹¹³ No. 23, '94; ⁸¹⁴ Sept. 1 has found acute œdema of the lungs in thirty-one of fifty-one cases dead of croupous pneumonia. The exudate within the alveoli contained diplococci in large numbers and almost in pure culture. Both during life and after death many of the alveoli contained red and colorless blood-corpuscles and desquamated epithelium. The œdema is considered as an acute inflammatory process dependent upon the presence of the diplococcus, and corresponding with the interstitial stage of pneumonitis.

Symptomatology.—Simon,⁹² July 10, '94 believes that the tympanitic resonance observed at the level of the area of hepatization, in cases of pneumonia of the apex, is not due to the acoustic qualities of the hepatized lung itself, nor to the vibration of the air in the bronchi of this part, but that it may sometimes result from transmission of the sonorous vibration of the air contained in the large bronchi and the trachea; although most often it is the

result of the vibration of air contained either in the subjacent lobes, relaxed by reason of the augmentation of volume of the hepatized lobe, or in the uninvolved relaxed parts of the hepatized lobe itself.

Miller³⁶⁶_{B.27, H.2; June, '94}⁵ has made a study of pneumonia in early infancy at the Moscow Orphan Asylum. During the past ten years 15,544 deaths have taken place from affections of the respiratory tract, among a total of 155,459 deaths, and, of this number, 14,411 died from pneumonia. Among those born before term, 18 per cent. developed pneumonia. Of the deaths due to disease of the respiratory tract, pneumonia was present in 92.7 per cent. Ten per cent. of the infants admitted had congenital syphilis; of these, 23.9 per cent. died from pneumonia. A few cases of congenital pneumonia in which the disease made its appearance during intra-uterine life were observed. Such cases may be due to syphilis on the part of the mother or to septicæmia, the infection taking place through the placental circulation. Two cases of congenital pneumonia appear to have been caused by the circulation of the pneumococcus in the blood of the mother. Infants with ophthalmia developed bronchitis or pneumonia more frequently than those not so affected. Among the fatal cases, 7570 were in males and 6841 in females. Season had but little influence upon the prevalence of the disease. Half of the fatal cases occurred in children under 6 weeks of age. The disease was primary in 33.6 per cent., secondary in 66.4 per cent., and congenital in 7.5 per cent. In some of the congenital cases the disease ran its entire course before birth. Congenital pneumonia may be septic or syphilitic. In cases of the first group the greater part of the lobe is usually involved, and the pleural cavity contains more or less thick fluid. The syphilitic form of congenital pneumonia is comparatively frequent, comprising but 7 per cent. of congenital cases. It may appear (*a*) as a diffuse gummatous infiltration of the lung; (*b*) as the so-called white hepatization. The latter was seen but rarely, never in full-term children. In this form the lungs are increased in size and contain infiltrated white areas; the alveoli are filled with fattily degenerated epithelium. (*c*) In the form of scattered gummatous swellings, varying in size from a pin-head to a walnut, and surrounded by an area of interstitial inflammation. (*d*) As congenital interstitial pneumonia,

probably dependent upon syphilis. In the majority of the syphilitic infants who died with pneumonia the autopsy revealed the ordinary diffuse variety. In 94 per cent. the ordinary forms of lobar pneumonia and broncho-pneumonia were present; the former in $33\frac{1}{3}$ per cent., the latter in $66\frac{2}{3}$ per cent. Intra-lobular pneumonia was found in $6\frac{2}{3}$ per cent., half of which were complicated by broncho-pneumonia. Pleurisy was much more frequent with lobar pneumonia than with broncho-pneumonia. The same was true with regard to purulent meningitis. In some cases of broncho-pneumonia in young infants, not the slightest change in the bronchial mucous membrane could be detected. In cases in which the broncho-pneumonia or lobar pneumonia involved but one side, bronchitis was present in the other lung in 15 per cent. of the cases. The majority of the cases of primary lobar pneumonia in the very young presented continuous high fever for a few days, followed by collapse, with subnormal temperature, œdema, general cyanosis, and death, many dying before the completion of the third day. Recovery was exceptional, and occurred only in strong children over 4 weeks of age. Ninety-seven per cent. of cases were fatal. In a small number of cases both lobar pneumonia and broncho-pneumonia were present together. In children under 6 weeks of age there was almost always entire absence of cough. Vomiting was a frequent symptom. Hæmoptysis occurred in but one. The temperature was usually of a remittent type and of short duration. Positive cyanosis and dyspnoea were seen only in the stronger children. Emphysema was a complication in nearly one-fourth of the cases. Six per cent. displayed bronchiectasis; cirrhosis of the lung was noted in 0.5 per cent., abscess in 2.2 per cent. In 9 per cent. the acute process was followed by chronic broncho-pneumonia. But 9 per cent. of the cases developed pulmonary tuberculosis; of this number 77 per cent. showed general tuberculosis. Pleurisy was a complication in 15 per cent., parenchymatous nephritis in 3 per cent. One case in sixty-three displayed pericarditis, one in eighty-nine peritonitis.

Thibaudet, of St. Claude, ²²⁰_{June 2, '94} reports five cases of what he believes to be abortive pneumonia,—a condition that he considers characterized by its short duration, of from three to five days; its abruptness of defervescence, in from one to three hours; slight impairment of resonance and a soft, diffuse, and inconstant mur-

mur; fine, superficial, and inconstant pleural crepitation; white, pink, or rust-colored viscous expectoration, according to the intensity of the process; and, finally, sudden modifications, from day to day, in the auscultatory phenomena. Moritz²¹_{May 12, '94} relates a case of pneumonia in a robust young man, with elevation of temperature, full pulse, slight cough, and the expectoration of a small amount of blood-streaked sputum in which diplococci were found in pure culture. Physical examination disclosed only the presence of coarse râles in the lungs. On the fourth day the temperature declined and convalescence set in.

Sanderson¹⁴⁷_{Dec., '93} describes a case of pneumonia with complete consolidation of the lower lobe of the affected lung, but setting in without a chill and presenting no dyspnoea. The respiration only reached 23, and the fever was slight, the temperature but once reaching 103° F. (39.5° C.). The sputum, however, contained diplococci.

Ewing, of New York,¹_{Dec. 16, '93} has made a study of the leucocytosis of lobar pneumonia, and presents the following summary: In most cases of lobar pneumonia there is a marked leucocytosis. This may be absent or inconsiderable (*a*) in very mild cases; (*b*) in very severe cases in which the reaction of the system is slight. The degree of leucocytosis in pneumonia is proportional, on the average, to the extent of the local lesion, but it follows much more exactly the grade of systemic reaction to the poison generated.

In cases of acute tuberculous inflammation of the lung clinically resembling lobar pneumonia, there was no leucocytosis. In pulmonary tuberculosis complicated by suppurating cavities, exudative pneumonia, pleurisy, or chronic anæmia, there was usually a moderate leucocytosis. In typhoid and typhus fevers there was none. In empyema and actinomycosis of the lung there was considerable leucocytosis.

In obscure forms of lobar pneumonia, in which ordinary physical signs and rational symptoms are insufficient for diagnosis, the examination of the blood may give useful evidence. Well-marked leucocytosis is a valuable aid in the differential diagnosis between lobar pneumonia and typhoid or typhus fevers.

In acute apical lesions the absence of leucocytosis is decisive evidence in favor of tuberculosis, except when dealing with a lobar pneumonia which is very mild, or whose course is asthenic.

The examination of the blood is of no value in the diagnosis between lobar pneumonia and empyema or actinomycosis of the lung.

Well-marked leucocytosis in lobar pneumonia, while in itself a favorable sign, does not assure that the disease will pursue a favorable course, but indicates usually a severe infection. A moderately low degree is an extremely unfavorable sign. In severe cases absence of leucocytosis indicates, with rare exceptions, that the disease will prove fatal. Most cases of lobar pneumonia in which the lesion extends to the pericardium and peritoneum are attended with slight leucocytosis.

Bieganski, of Czstochowa, ⁵⁶⁹_{Nos. 47-49, '93} has found that in all cases of pneumonia terminating in resolution leucocytosis is constant and pronounced. The condition makes its appearance at the onset of the disease, attains its maximum toward the close before the crisis, and comes to an end almost immediately afterward. In cases in which defervescence takes place by lysis the leucocytosis also recedes slowly. The increase in colorless cells affects especially the polynuclear leucocytes, while the number of mononuclear leucocytes remains the same. In two fatal cases the leucocytosis failed to appear, and on several occasions the number of leucocytes was subnormal. Leucocytosis was observed in but one case of typhoid fever, and in this pneumonia appeared as a complication in the fourth week of the disease. In this case it had anticipated the physical signs. There was invariably no increase in the number of colorless blood-cells in cases of pleurisy with effusion, unless this was purulent. In this condition the increase did not so exclusively affect the polynuclear corpuscles as in pneumonia. Leucocytosis was also found in two cases of advanced pulmonary tuberculosis attended with fever, but the condition did not present the characters of the leucocytosis of pneumonia. The number of colorless blood-corpuscles was found normal in a case of acute bronchitis with fever and dyspnœa.

As the outcome of a study of sixteen cases of pneumonia, Laehr ⁷_{Nos. 36, 37, '93} ⁹⁹_{Mar. 22, '94} found a marked correspondence between the height of the fever and degree of the leucocytosis, in that they rose and fell together, but the correspondence did not go so far as to show that the greatest number of leucocytes was always associated with the highest temperature. A certain parallelism was

also observed between the former and the amount of infiltration; but that other factors were present is shown by two cases, both in powerfully-built men, in one of whom the whole right lung was affected and yet the leucocytes numbered only from 10,000 to 14,000, while in the other, though but one lower lobe was attacked, 51,000 were counted. Diagnostically, it is believed that a blood-count may prove of great value in distinguishing early cases of pneumonia from typhoid fever, meningitis, influenza, and probably miliary tuberculosis, in which little or no increase in the white elements has been found. In prognosis it may with probable safety be said that if the number of leucocytes do not diminish with the fall of the temperature the process has not come to an end, or if it sink with the temperature to normal, but rise later, a recrudescence of fever or the appearance of some complication may be confidently looked for. In the most severe cases no leucocytosis was observed, or else a very slight increase in the number of white cells.

As the result of experimental study Tchistovitch ¹¹⁰¹_{V.2, No.5} has found that substances or cultures which produce leucocytosis in healthy rabbits fail to do this in rabbits that have been inoculated with virulent cultures of the diplococci of pneumonia, the diminution in the number of leucocytes noticeable after the inoculation continuing to progress; or these substances may induce but a slight and passing leucocytosis, which is followed by a renewed decrease in the number of colorless corpuscles; but only in cases in which the symptoms of intoxication induced by the toxins of the diplococci are not well marked. The result of a study of the changes in the number of colorless corpuscles of the blood in four fatal cases of croupous pneumonia is also noted. In one case, in which the number of colorless corpuscles was diminished, hepatization of the lower lobe of the left lung was found, without complication. In the three others distinct leucocytosis was present. In one of these death resulted from meningitis, in another from meningitis and endocarditis, and in the third almost the whole lung was involved, death resulting with symptoms of asphyxia. In all three death was thus due not to the virulence of the diplococcus, but to other causes.

Monti and Burggrün ¹⁵⁸_{B.17, II.1, 2, 194} made a study of the blood in nine cases of uncomplicated lobar pneumonia in children. In five the

specific gravity was below normal, in two normal, and in two above the normal. In cases in which the specific gravity was low the patients were poorly nourished and undersized. The specific gravity increased with the rise of temperature and extension of the pneumonic process, and appeared to increase more rapidly when a large portion of the lung became suddenly involved, being correspondingly slow when the involvement was gradual. It sank or remained unchanged as soon as the disease reached its acme, and also before the crisis and signs of resolution could be made out. The changes in the hæmoglobin were not constant in relation to the disease in the lung. During the development and extension of the disease there was no change in the number of red blood-corpuscles. With the beginning of resolution the number diminished. The onset of the disease was marked by leucocytosis of moderate degree, increasing with the spread of the morbid process, being pronounced when the extension of the disease in the lung was rapid, and less marked when the spread was gradual and not extensive. With the beginning of resolution there occurred a diminution in the number of colorless cells, the rapidity of which corresponded with the rapidity of resolution.

Picchini and Cout, of Cremonne, ¹¹_{Apr. 11, '94} have found that the toxicity of the serum of the blood varies in different cases of pneumonia at the same period of the disease and also at successive stages of the disease. The urotoxic co-efficient likewise presents great variations. A certain relation was observed between the toxicity of the serum and the urotoxic co-efficient.

Wagner, of Wilkesbarre, ¹¹²_{Apr., '94} has reported a case of pneumonia, in a boy 5 years old, in which the temperature reached 109.2° F. (42.8° C.), with ultimate recovery.

Complications.—Chantemesse ³_{No. 73, '93} has called attention to the occurrence of transitory aphasia in the course of pneumonia, and cited an illustrative case. It was pointed out that when this complication occurs it usually appears toward the close of the second or third day of the attack, being ordinarily preceded by headache and vertigo, and sometimes by numbness and tingling in the right side of the face and in the right upper extremity. The aphasia may set in abruptly, without loss of consciousness; at other times it may become manifest after a typical apoplectiform seizure. The characters of the impairment of speech do not differ from those

dependent upon an organic lesion of the third frontal convolution upon the left side of the brain. The paralysis may involve the entire right side of the body, but usually only the inferior portion of the right side of the face, the right half of the tongue, and the right superior extremity are affected, while, as a rule, sensibility and the reflexes are not altered. In pronounced cases the paralyzed parts may be the seat of increased redness, and œdema more or less circumscribed and increased by heat. These phenomena persist commonly for from a few hours to a few days, and seem in no way to influence the primary disease. Their fugaciousness excludes the possibility of organic disease, and their character and association are unlike those of hysteria. It seems probable that the condition is to be ascribed to the action of the toxic products of the activity of the organisms upon which the pneumonia depends, either directly upon the nervous centres or indirectly through the intermediation of the vasomotor system, causing contraction of the cerebral vessels to such a degree as to compromise the function of the parts controlling the peripheral mechanism. In the cases observed by Chantemesse the pneumonia affected the right side.

At the Eleventh International Medical Congress, held at Rome, Robert ^{827 5}_{No. 19, '94; Sept.} dilated upon the gravity of the delirium of pneumonia, especially by reason of its inhibitory influence upon the tracheo-bronchial reflex centre, which, it has been demonstrated, is situated in the dorso-lateral portion of the pneumogastric centre. It was pointed out that the cerebral disturbances that appear in the course of an attack of pneumonia do not have a common pathogenesis. The most rational explanation is to be found in the action of various toxins or toxalbumins. The delirium that occurs during the period of engorgement and red hepatization is probably due to hyperæmia of the cerebral membranes; that occurring during the period of gray hepatization, to the meningeal complications resulting from secondary infection; that occurring during the period of defervescence, to cerebral anæmia or perhaps to passive congestion. The delirium of active cerebral hyperæmia is characterized by great agitation and marked insomnia; the face is red, the sclerotics injected, the pupils contracted, the pulse, as a rule, frequent and strong. Therapeutically, antipyretics, cerebral derivatives, and bleeding are indicated. In case of passive hyper-

æmia, the condition is one of tranquility and incoherence alternating with periods of somnolence; the general state is rather typhoid. Cardiac and cerebral stimulants are indicated. In case of cerebral anæmia the delirium is of a reasoning character, the patient being loquacious in alternation with hallucinations of agreeable or frightful character.

Juliusburger, of Berlin, ⁶⁹_{Nov. 30, '93} reports a case of pneumonia in a man, 60 years old, previously in good health and not addicted to alcoholic excess, complicated by acute mania and terminating fatally. Upon post-mortem examination, there was found, in addition to pleuro-pulmonary lesions, a purulent meningitis with the presence of innumerable pneumococci. Campbell, of London, Canada, ⁹_{Mar. 3, '94} describes three cases of pneumonia followed by mania. One was a young man 20, one 16, and one 15 years old. In all the right side was affected. Two terminated fatally. Mattice, of Sedro, Washington, ⁹_{June 2, '94} has also reported a case of mania following pneumonia, in a woman 35 years old, with recovery.

Bernheim, of Nancy, ³¹_{Feb. 21, '94} observed a case of pneumonia, in a man 31 years old, complicated by purulent arthritis, meningitis, and vegetative endocarditis. In the pus from the meninges, the affected articulations, and the valvular vegetations, pneumococci were found. A second case is cited in which, in conjunction with pneumonia, endocarditis due to pneumococci was found post-mortem. Holt, of New York, ⁵¹_{Dec., '93} reports a case of cerebro-spinal meningitis, in a child 13 months old, due to the diplococcus pneumoniae. In a case of acute pleuro-pneumonia with delayed resolution, in an infant 6 months old, a relapse occurred after about a week's interval, death taking place on the fifteenth day of the second attack, from diffuse purulent meningitis. In a third case bilateral pneumonia occurred in a child 1 year old, and was complicated by a diffuse purulent meningitis of the convexity, symptoms of which appeared on the thirteenth day. In a fourth case, in a child 20 months old, an attack of pleuro-pneumonia, in which almost complete resolution had taken place, was followed on the twenty-fourth day by the development of symptoms of meningitis. The course of the disease closely resembled that of tuberculosis and terminated fatally. In a fifth case, in a child 2 years old, an attack of acute lobar pneumonia was followed by tuberculous meningitis, with a fatal termination. In a sixth case,

in an infant 9 months old, an attack of illness believed to have been influenza was complicated by pneumonia, and this in turn by meningitis, with a fatal result.

Osler, of Baltimore, ¹¹²_{Jan., '94} reports a fatal case of pneumonia of the upper third of the lower lobe of the left lung, in a man 33 years old, complicated by pleurisy and parotiditis. Hamilton, of Cassville, Pa., ¹¹²_{Feb., '94} also relates a case of pneumonia, in a man 45 years old, in which parotiditis occurred as a complication, also ending fatally, death being preceded by delirium and pronounced symptoms of meningitis. Porte ³¹_{June 30, '94} treated a case of pneumonia of the right apex, in a woman 48 years old, complicated by obliterative inflammation of the right internal saphenous vein; and another, in a young man, presenting general icterus, with epistaxis.

Hood, of London, ⁶_{Aug. 18, '94} discusses certain symptoms and immediate consequences of acute pneumonia. He reports several cases of pneumonic involvement of the upper lobes attended with copious hæmoptysis, and calls attention to the cerebral phenomena that often appear in cases of apical pneumonia in children. It is believed that, other things being equal, the smaller the amount of pneumonic inflammation, the earlier the subsidence of the consequent inflammatory fever. If in what is apparently a pure uncomplicated attack of acute lobar pneumonia the critical stage is absent and resolution does not take place within a reasonable time, examination will most likely disclose the existence of some complicating condition, of which pleural effusion is one of the most common. The cough which attends such residual effusions is essentially paroxysmal, being induced by movement, and is not usually followed by expectoration. When pneumonia commences in the lower lobe of either lung the inflammatory process is frequently associated with symptoms that may deceive the unguarded, such as severe epigastric pain or jaundice or other derangement of the gastro-intestinal tract.

At a meeting of the Medical Society of Hamburg, Manchot presented ⁶⁹_{Feb. 15, '94} a specimen of ulceration of the margins of the epiglottis in the course of croupous pneumonia. Staphylococci were found in the depth of the destroyed tissue. Snow, of Buffalo, ⁵¹_{Aug., '94} has reported a fatal case of purpura hæmorrhagica in a female infant in which, upon post-mortem examination, an unsuspected pneumonia was found.

Sawyer, of Kansas City, ¹⁰²_{June, '94} observed a case of measles, in a boy 13 years old, complicated by bilateral pneumonia, terminating by crisis forty-eight hours after the initial chill. From a study of the literature and from histological investigation, Hektoen ⁴⁵¹_{Aug., '94} concludes that fibrinous pneumonia may lead to diffuse interstitial proliferation and ultimately to pulmonary cirrhosis. Interstitial proliferation and persistence of the inflammatory exudation appear to bear a close relation to each other. Diffuse interstitial changes have not been found in lungs in which the pneumonic exudate had undergone resolution and absorption. The persistent inflammatory exudate maintains the alveoli in distension, hinders epithelial reproduction, and, in short, enacts the rôle of an irritating foreign body, at the same time that it presents a groundwork for the growth of granulation tissue. Failure to remove the inflammatory products by lymphatic absorption, and incidentally by expectoration, depends upon (*a*) absence of resolution,—*i.e.*, softening does not occur freely,—and hence the exudate does not become fit for ready removal, which may be blocked by (*b*) mechanical obstruction in the pulmonary lymphatic apparatus, and (*c*) on account of general degenerative conditions in the body, especially the vascular system. It is not impossible that the proliferation may be due to the primary, direct effect of the microbic invasion. This seems, in fact, likely in those lungs that present interstitial changes a few days after the onset of the pneumonia; but inasmuch as such changes are, to a certain degree, characteristic of pneumonia, being transitory and incidental to the absorption of the exudate, it becomes very hard to define the exact relation between proliferation and retention of the inflammatory product. Taking, however, the considerations stated into view, it seems clear that the interstitial changes depend essentially upon the retention of the exudate, and not *vice versa*.

Tennant, of Belfast, ³⁶_{July, '94} reports the case of a man, 60 years old, in which, upon dissection, the posterior portion of the left half of the diaphragm presented a thin, translucent appearance, and contained but a few scattered muscular fibres, while the remainder of this half was membranous. The left phrenic nerve was examined microscopically, but displayed no abnormality. Two tumors, probably gummata, were found deeply seated in the muscles of the thigh. There were also some cicatrices, probably of syphilitic

origin, on the lower limbs. In addition an old contraction of the mitral valve was found. The patient died from an attack of croupous pneumonia, and the condition of the diaphragm was not suspected.

Diagnosis.—Zenoni,³¹⁹_{Mar.24,'94} in differentiating between pneumonia and bronchitis, stains cover-glass preparations of the sputum with a half-saturated, aqueous solution of safranin. These are examined upon a white ground. If the case is one of pneumonia, albumin preponderates and a red color results; when bronchitis exists, mucus predominates and the color will be quite distinctly yellow.

As the result of a clinical investigation, Federici¹¹⁶⁹_{V.32, No.3;} ³¹⁹_{Mar.31,'94} concludes that the elimination of increased quantities of peptones in the urine, with diminished elimination of chlorides, may in doubtful cases be of diagnostic significance in the recognition of pneumonia.

Treatment.—Petresco, of Bucharest,¹⁴_{Apr.11,'94} reiterates the successful results obtained from the employment of large doses of digitalis in the treatment of pneumonia, his experience covering 1192 cases, with a mortality-range of from 1.22 per cent. to 2.66 per cent. The formula that he has employed consists of an infusion of the leaves of digitalis (4, 5, or 6 grammes—1, 1½, or 1½ drachms), 200 grammes (6½ fluidounces), and simple syrup, 40 grammes (1¼ fluidounces), of which a teaspoonful is taken every half-hour. The treatment is thus continued for two or three days, according to the condition of the pulse and the temperature.

Belloti⁸⁰_{Mar.16,'94} confirms his own previous experience and that of others, regarding the good results obtained in the treatment of croupous pneumonia by this method.

On the other hand, Havas¹¹⁶_{Sept., '94} has employed quite large doses of digitalis in the treatment of pneumonia, but without favorable results.

Sziklai¹¹³_{p.184; Mar.1,'94} ⁸¹⁴ has employed a combination of pilocarpine and antipyrin in a weak infusion of ipecacuanha in the treatment of forty cases of pneumonia, without a death.

Kovacs⁵¹²_{No.14; July 1,'94} ⁸¹⁴ reports a case of pneumonia very successfully treated with pilocarpine, and cites two other cases treated with similar favorable results. He employed a dose of 0.07 gramme (1⅛ grains).

BRONCHO-PNEUMONIA.

Albu, of Berlin, ⁶⁹_{Feb.16,'94} ²_{Mar.31,'94} considers the pneumonia of influenza as really a broncho-pneumonia, comparable with that observed in other infective diseases. It presents the following distinctive features: 1. Evidence of a preceding attack of influenza is generally present. 2. Percussion-dullness may be absent or only present for a short time, shifting its position; bronchial breathing may be the only physical sign; moist sounds are most constantly present. 3. The sputum is never typically rusty. 4. The fever usually sets in without shivering, and the temperature rises gradually. 5. The course is less acute, the infiltration disappears slowly, and convalescence is retarded. The accompanying pleurisy has several peculiarities: (*a*) it is more frequent than in croupous pneumonia; (*b*) absorption takes longer; (*c*) empyema is less frequent, only occurring when the streptococcus is present. This streptococcous empyema is comparatively unfavorable. The frequency of this streptococcous infection is considered characteristic of influenza; the infiltration affects single lobules, but it may become confluent; it is softer, poorer in fibrin, richer in cells, and may have the character of a purulent fluid. The occurrence of abscess and gangrene has been noted. If such a necrotic focus abut on the surface, it may produce a pneumothorax. Croupous pneumonia is believed to be a chance complication of influenza due to secondary infection with the pneumococcus. A double infection with the influenza bacillus and Fraenkel's pneumococcus may occur. A confluent broncho-pneumonia may simulate croupous pneumonia.

Among forty-five fatal cases of variola, Auché, of Bordeaux, ²⁵_{Dec., '93} ⁴⁵¹_{Jan., '94} found seventeen (or 37 per cent.) affected with some form of broncho-pneumonia, the proportion varying somewhat in adults and in infants (40 per cent. for the former and 32 per cent. for the latter). The pulmonary complication appeared in all the graver forms of the infection, in hæmorrhagic small-pox, in the confluent, coherent, and in the distinctly discrete types. It was almost invariably encountered in persons dying during the suppurative period of the disease; in only one case—a case of hæmorrhagic variola—was it met with as early as the third day of the eruption. As a rule, the pneumonia presented itself as a bilateral lesion, although there seemed to be a tendency to wider

invasion on the right side in many instances. The favorite seats of involvement were the lower lobes and the middle lobe of the right lung; along the posterior borders, the lateral surfaces, and, less frequently, the anterior borders and the apices. In order of frequency of occurrence in this series of cases, the complication appeared as acute catarrhal pneumonia (*spléno-pneumonie aiguë*), with marked congestion, as pseudolobar broncho-pneumonia, and as disseminated broncho-pneumonia. The bronchial alterations consisted, for the most part, of a simple tumefaction of the bronchial mucous membrane, with proliferation and desquamation of the epithelial cells, with sometimes complete denudation of the surface of the mucosa and intense infiltration of the bronchial walls with embryonic cells. The bronchial lumen contained, and was sometimes filled by, an exudate composed of a mass of fine granulations made up of great numbers of small round cells, together with some broken-down epithelial cells and a few large, round, granular, and pigmented cells, with small, feebly-staining nuclei. At some places blood was found in the bronchial lumen. The alveolar alterations occurred either as splenization, as red hepatization, or as gray hepatization. In the splenified areas (catarrhal and congested areas) the endothelial cells appeared as if swollen, proliferated, and desquamated; the vessels were dilated, and in the interior of the alveoli could be seen an exudate composed of large endothelial cells, with granular protoplasm and feebly-staining nuclei. In the red hepatized areas the alveoli were occupied by fibrinous net-works imprisoning in their meshes endothelial cells and white and red blood-globules; and in the gray hepatization the alveoli were filled with leucocytes and fewer large, darkly-granular cells, while the alveolar walls were infiltrated with embryonic cells and the vessels had become less distended and for the most part invisible. These lesions are regarded as different stages of alveolar inflammation; and, as a rule, they are distributed somewhat irregularly as compared to the classical descriptions of broncho-pneumonia with its bronchial infiltration and peribronchial hepatization and peripheral zone of splenization. Yet, generally, in the centre of each patch of involvement it could be seen that there was a greater degree of intensity of the process, even if, peripherally, the alveoli were in a red or gray hepatized condition, and not surrounded by the zone of splenization.

In connection with these lesions, probably causal, it was possible to demonstrate the presence of various forms of micro-organisms, sometimes a single variety, sometimes associated varieties. Those most frequently found were the pneumococcus lanceolatus of Fraenkel, the streptococcus pyogenes, and the staphylococcus of suppuration. These bacteria are regarded as infectious agents secondary to the variolous infection, gaining entrance to the lungs from the buccal cavity, from pustules in the air-passages, or from the exterior. It is not believed that there is a direct relation between the unknown specific agent of the disease and the pulmonary complications.

Alfieri ⁹³⁰_{Nov.1, '93} found, on bacteriological examination of a case of fetid broncho-pneumonia, in addition to the staphylococcus pyogenes citreus, a bacillus from $1.5\ \mu$ to $2.5\ \mu$ long and $0.8\ \mu$ thick, not forming spores, stainable by the method of Gram, and capable of cultivation upon the usual nutritive media. The bacillus proved virulent for rabbits and guinea-pigs.

Hehir, of Hyderabad, ²⁵⁹_{Nov.16, '93} reports a fatal case of broncho-pneumonia, in an infant 9 months old, in which the temperature reached 110.4° F. (43.5° C.).

From a study of the bronchial infections of the aged, Monnier, of Nantes, ¹²⁷_{Apr.12, '94} concludes that the broncho-pneumonias in old persons are most commonly due to streptococci; very rarely they may be caused by the bacillus pyocyaneus. They may give rise to general infection and pyæmia, manifested on the one hand by arthritis and on the other by cutaneous eruptions, such as ecchyma or purpura. These may result from the action of the micro-organisms already present or from secondary infection.

Etienne, of Nancy, ³⁶⁰_{May, '94} reports the case of a soldier in whom broncho-pneumonia with purulent pleurisy developed after an attack of measles. Following thoracentesis, the chest-wall on the affected side became retracted with marked deformity, the ribs being so profoundly displaced that dislocation took place at the junction of the fourth, fifth, and sixth ribs with their respective cartilages. The wound of opening failed to close and a constant discharge of pus took place through a fistula. The patient became extremely emaciated and finally died.

Bremner, of Mt. Vernon, N. Y., ⁵¹_{Dec., '93} reports a fatal case of broncho-pneumonia, in a child $3\frac{1}{4}$ months old, complicated by

purulent pericarditis and acute nephritis. He also ⁵¹_{Jan., '94} reports two fatal cases of broncho-pneumonia, in infants 9 and 18 months old, respectively, complicated by purulent meningitis.

PLEURISY.

Chantemesse ¹¹⁵³_{June 30, '94} ⁹⁰_{Aug., '94} relates two cases of his own and one of Lyons, of pleurisy occurring during the secondary stage of syphilis, and, after a review of the recorded cases, concludes that during the secondary stage of syphilis a specific form of pleurisy may develop, being frequently bilateral, arising and disappearing rapidly, the recovery being perfect and influenced by specific treatment. The affection generally makes its appearance two or three months after the appearance of the chancre, and rarely as late as from eighteen to twenty-four months afterward.

The onset may be insidious and unmarked by any symptoms; or acute, and accompanied by pain, cough, and dyspnoea; the former being probably the more frequent. When the latter is the case, the pleurisy may possibly be diaphragmatic. Fever is, as a rule, moderate, and the rise of temperature so frequently seen at this stage of syphilis is probably often due to a pleurisy which is undetected because of the absence of suggestive symptoms.

Of the 14 cases studied, 3 were examples of dry pleurisy and 11 of serous effusion; half were unilateral and half bilateral, and in only 2 of the latter was there any considerable amount of fluid on both sides, the rule being the presence of dry pleurisy on one side and fluid on the other. The duration is generally about two or three weeks if specific treatment is adopted, and the prognosis is good, perfect recovery being the rule. The presence of pleurisy may, however, be taken as a sign of a virulent syphilitic infection, and treatment must not be neglected.

The pathology of the lesion is uncertain, as no post-mortem has ever been made. By some it is considered a general eruption on the surface of the pleura, analogous to that on the skin; others suggest that it is due to a lymphangitis; while still others look on it as arising from a periostitis of the inner surfaces of the ribs.

In treatment intra-muscular injections of mercuric iodide dissolved in sterilized olive-oil are recommended, from 0.004 to 0.008 grammes ($\frac{1}{16}$ to $\frac{1}{8}$ grain) being given daily for several months.

Osler, of Baltimore, ²⁰³²_{'93} ⁹⁰_{Jan., '94} states that, of 101 cases of pleurisy

examined post-mortem, 32 were definitely tuberculous and 13 existed in patients with tuberculous lesions of the lungs without any definite proof of the tuberculous character of the pleurisy. By far the commonest forms of pleurisy were sero-fibrinous or fibrinous exudation, secondary to acute disease of the lungs, or occurring at the termination of chronic affections of the heart, arteries, or kidneys.

The following clinical types are described:—

1. *Acute Tuberculous Pleurisy*.—These cases are rarely fatal, a large majority completely recovering, a few becoming chronic, and a variable number developing tuberculosis of other organs later. They may be divided into three groups: (*a*) Acute tuberculous pleurisy, with subsequent chronic course, may set in acutely without anything to suggest tuberculosis. After a series of tapplings the patient may recover, with evidences of thickened pleura. Recurrence and ultimate infection of the lungs may occur. (*b*) Secondary and terminal acute tuberculous pleurisy may occur in the course of pulmonary tuberculosis, or at the end of some chronic disease,—*e.g.*, of the heart, arteries, or kidneys, or cirrhosis of the liver. In these latter there is generally found a tuberculous lesion of the apex or of the bronchial glands. (*c*) Acute tuberculous suppurative pleurisy running a rapid course.

2. *Subacute and Chronic Forms*.—(*a*) With sero-fibrinous exudation. This is by far the commonest, and may occur as a complication of well-marked tuberculosis elsewhere (*e.g.*, in the lungs), or be the only obvious lesion; though in the latter case a tuberculous focus generally exists in the lungs, bronchial glands, or peritoneum. This is a very important class of cases, as the onset is generally insidious, and the character of the disease often overlooked. A certain number ultimately die of pulmonary or general tuberculosis. (*b*) With purulent exudation. The disease is generally subacute in onset and chronic in course. (*c*) Chronic adhesive tuberculous pleurisy, with enormous thickening. It is generally preceded by tuberculosis of the bronchial glands. The thickened layers may unite in their whole extent, forming a solid membrane, with patches of softening, or a space may be left below filled with fluid. The process may extend into the lung.

3. *General Serous-Membrane Tuberculosis*.—A group of cases in which the serous membranes are affected, either simultaneously

or, more generally, one after the other, the pleural being usually secondary to the peritoneal affection. (a) Acute tuberculosis, with rapid evolution of disease in the pleuræ and peritoneum, generally consecutive to disease of the tubes in women, or of the bronchial or mesenteric glands. (b) More chronic. Exudation occurs into the pleuræ and peritoneum, with caseation, ulceration, and suppuration. (c) Still more chronic, with much fibrosis and little exudation. The course of these serous-membrane tuberculoses is often very chronic, with periods of great improvement, and with little or no fever.

In the treatment of pleuritic effusion confidence is placed in a dry diet combined with cathartics and diuretics. Aspiration is recommended at the tenth day, if the fluid still reach the level of the fourth rib. Counter-irritation is strongly advocated. Pulmonary gymnastics, by means of Wolff's bottle, are useful when there is much thickening of the pleura.

Brial, of Bordeaux, ¹⁸⁸_{Feb. 11, '94} reports a case of partial calcification of the pleura in a man, 62 years old, who, during life, presented the signs of cardiac hypertrophy with albuminuria. Several days before death gangrene of the right foot developed, suggesting obliteration of the pedal artery.

Gerhardt, of Berlin, ⁴_{No. 23, '93} ²⁶_{June 2, '94} points out that, although a collection of fluid exudation between the surfaces of two lobes of a lung occasionally occurs in cases of general pleurisy, primary forms of this partial pleuritis are not of very frequent occurrence; they are, however, of the greatest clinical importance and present fairly good characteristic symptoms. The most important of these, which is preceded by fever and pain in the side, is the presence of a strip of dullness, from about three-fourths to one inch in breadth, running from the third or fourth thoracic vertebra obliquely downward and outward, and reaching the lower edge of the lung somewhat in front of the anterior axillary line. The typical signs of pleuritic exudation are not necessarily distinct; the vocal fremitus may be increased, the respiratory sounds may be exaggerated or bronchial, and loud, hollow râles be audible. After the lapse of a more or less lengthy period of time the temperature suddenly falls, and apyrexia is followed, either immediately or very shortly, by the expectoration of an exceedingly large quantity of purely purulent sputum, which is frequently very offensive and

only subsides after weeks or even months. In a few cases the malady terminates fatally with the symptoms of septicæmia. Upon post-mortem examination in all the fatal cases there will be found firm adhesions between the visceral and parietal pleuræ, pointing to the possibility of previous general pleuritis, a small portion of the exudation of which may, after cure, have remained between the contiguous surfaces of the two lobes, and then, supuration having set in, have presented the symptoms of primary empyema. In those cases in which the exudation is putrescent one is justified in assuming previous pulmonary trouble, or the perforation and penetration of the pleural cavity by the contents of a disintegrated gland. Most of the cases run a favorable course as soon as the fluid gains access to the air-passages without operative interference; consequently, when the pus is situated very deeply it is as well to reserve operative measures for those cases in which there is no improvement after weeks or even months have passed. On the other hand, when the pus lies close to the wall of the chest there is no reason whatever to delay the operation that would be indicated in every other form of empyema.

Thibaudet, of St. Claude, ²²⁰_{Aug. 18, '94} reports a case of primary purulent pleurisy, due to pneumococci, simulating pneumonia and attended with spontaneous rupture into a bronchus, terminating in recovery.

At a meeting of the Royal Medical and Chirurgical Society of London, Washbourn ²_{Mar. 3, '94} reported three cases of pleurisy due to the pneumococcus, and presenting constitutional symptoms resembling those of pneumonia. In two the effusion was purulent and in another bilateral and sero-fibrinous. White reported six cases of similar kind in which the following points were especially noted: (1) the signs of pneumonia were usually atypical, especially the local signs; (2) the temperature, as a rule, fell slowly; (3) the physical signs did not clear up readily, and the patient did not feel much better after the temperature had fallen; (4) there was often a further rise after the initial decline of temperature, and this second elevation was often associated with diarrhœa; (5) the disease caused by the pneumococcus was a general disease, and might affect the pleuræ, the lungs, the meninges, the pericardium, etc.; (6) pericarditis, when it occurred, was due to infiltration of the pericardium by the pneumococcus, and was not attributable to

extension from the pleuræ; (7) there was not always pus present to explain the physical signs.

Thévenet ³¹¹_{Feb. 4, '94}, ⁹_{Mar. 24} reports a case of atrophy of the shoulder-muscles in the sequence of pleurisy occurring in a cook, 58 years old, who, although having been exposed, in the course of extended travel, to numerous sources of infection, had seemed to have escaped all. He had, however, had four attacks of acute articular rheumatism, of which the third was complicated by a left-sided pleurisy attended with a copious effusion. The fluid was spontaneously absorbed in the course of two months, but at the end of this time a little flattening of the left side of the chest was apparent, which became more pronounced in the course of the subsequent few months. When the man came under observation, in his fourth attack of rheumatism, five years after the third, the left side of the chest was found greatly flattened and contracted, its circumference measuring an inch and three-fourths less than that of the right side at a corresponding point. In addition, all of the shoulder-muscles were notably atrophied, particularly the deltoid. Elevation of the arm was brought about almost solely by the trapezius. The arm itself was but little wasted, although its circumference a short distance below the acromion was but little less than that of the opposite member in a corresponding situation, in spite of the fact that the right was the more used. Moreover, the man complained that for two years there had been progressive loss of strength in the left upper extremity. The weakness, however, could not be traced to any particular group of muscles. The dynamometer registered sixty upon the right and but twenty-five upon the left. In addition, cutaneous sensibility to touch, to puncture, to hot, and to cold was impaired upon the left half of the chest, the left shoulder, and the left upper extremity. The anæsthesia diminished progressively toward the periphery. It was believed that hysteria could certainly be excluded, and that the sensory and trophic changes were to be ascribed to the previous pleurisy.

Herz ⁸⁴_{No. 41, '93} reports satisfactory results from the administration of sodium salicylate, in doses of 6 grains (0.39 gramme) daily, in the treatment of pleurisy following exposure to cold. If the treatment is instituted sufficiently early, effusion may be prevented. The best results were obtained in rheumatic cases.

NEOPLASMS OF THE LUNGS, PLEURÆ, AND MEDIASTINUM.

An interesting discussion upon the subject of pulmonary neoplasms was held before the Société Médicale des Hôpitaux. Fernet ¹⁴_{Dec. 6, '93} reported a case of primary sarcoma of the left lung, in a woman 34 years old, without hereditary predisposition. For a year there had been intercostal pain, and several days before coming under observation there had been slight hæmoptysis. There was dyspnœa and an area of dullness posteriorly and laterally over the middle of the left lung, with absence of vesicular murmur over this region. The cough became paroxysmal and difficult, and was sometimes accompanied by sanguinolent expectoration. A protrusion of the chest developed, with complete immobility of the thoracic walls. The heart was displaced to the right. Examination of the sputum failed to reveal the presence of tubercle bacilli. As time progressed the aspect of the patient became cachectic, the axillary glands enlarged, and death occurred. Upon post-mortem examination a tumor weighing 2.1 kilogrammes (5½ pounds) was found, displacing the entire left lung. No other nodules were found in any organ. On histological examination the growth proved to be a spindle-celled sarcoma. The lung itself and the pleura were otherwise uninvolved. Bourey detailed the case of a man, 55 years old, with orthopnœa occurring paroxysmally and accompanied by intense wheezing. On physical examination there was found, upon the right side of the chest, dullness upon percussion, with absence of the vesicular murmur and of vocal resonance and fremitus. Above the right clavicle was an isolated, painless, hard, lobulated tumor, perhaps as large as a walnut. A diagnosis of malignant disease of the lung was confirmed by the subsequent expectoration of characteristic gelatinous matter. Catrin reported a case of probable tuberculosis, presenting a supra-clavicular, glandular enlargement, and disappearing under treatment. Rendu cited the case of a woman, of cachectic appearance, who presented an enlarged gland above the clavicle which was thought to be carcinomatous. There was also believed to be latent carcinoma of the stomach. Under the influence of rest and diet the condition of the patient notably improved, although the enlarged gland remained. Troisier reported the case of a woman who complained of pain in the left arm, thought to be due to the pressure exerted by a

single enlarged gland above the clavicle. The growth was removed and the patient apparently recovered. The growth being regarded as carcinomatous, the patient was kept under observation; for a time her health continued good, but eighteen months after the removal of the gland the woman died after an illness attended with symptoms of carcinomatous cachexia. The supposition of the existence of visceral carcinoma could not, unfortunately, be confirmed by post-mortem examination.

Monro, of Glasgow, ²¹³_{Mar., '94} reports the case of a man, 44 years old, with winter cough and expectoration for many years. The expectoration finally became purulent and more copious, and an attack of hæmoptysis occurred. The patient was unable to lie on his left side on account of a sense of choking. Strength failed rapidly and œdema appeared on the right side of the face. Movement was impaired in the upper part of the chest on the left side, while the percussion-note was dull between the clavicle and the sixth rib and between the right border of the sternum and the anterior fold of the left axilla. The respiratory murmur was feeble and tubular and associated with sibilant râles. The vocal resonance and fremitus were diminished. Posteriorly, the percussion-note was impaired over the apex, and over the upper two-thirds of the lung there were moist râles and feeble tubular breathing. The dyspnœa increased, and death resulted, apparently, from syncope. Upon post-mortem examination a large tumor-mass was found in the anterior mediastinum, with isolated nodules of various size below and in front of the pericardium, and small nodules on the anterior surface of the liver. A number of whitish nodules, chiefly of small size, were found both on the surface of the liver and on section. A small white nodule was also found in the substance of the right kidney. The left lung was concealed from view by the growth, which was adherent to the upper part of the right lung. The upper half of the left lung was converted into a hard, solid mass, measuring about eight inches vertically and seven inches transversely. On section there appeared congested pulmonary tissue below, a hard substance above. Of the latter the posterior portion was whiter in color, and consisted obviously of a new growth invading the lung from behind. The anterior portion varied in color between gray and black, as if the pigmented pulmonary tissue were being invaded,

by way of its fibrous septa, by the new formation. The glands at the back of the lung were enormously enlarged, and large nodular masses, many of them doubtless glandular, were arranged around the borders of the upper part of the lung. Microscopical examination of the affected lung and lymphatic glands showed the growth to be a sarcoma, which it is thought originated in the bronchial glands.

Ranglaret⁷_{No. 22, '93} describes the case of a woman, aged 34 years, who, eleven months before coming under observation, while in the sixth month of pregnancy, had an attack of left-sided pleurisy, from which she recovered imperfectly. Two months later she was safely delivered, in the interim complaining sorely of pain in the left side. The woman lost flesh and strength. She came under observation with intense intercostal pain and slight hæmoptysis. On inspection slight tumefaction of the left thoracic wall was found, over which percussion yielded a dull note. In this situation the vesicular murmur was completely suppressed. The heart was displaced somewhat to the right. Puncture at first failed to disclose the presence of fluid in the pleural cavity, but later an hæmorrhagic effusion was detected. Examination of the sputum did not reveal the presence of tubercle bacilli. The left half of the chest lost its mobility and the superficial veins became dilated. The condition of the patient grew progressively worse, the swelling of the chest gradually increased, and all the morbid phenomena were augmented. Finally, the axillary glands became enlarged. The patient ultimately succumbed to marasmus. Upon post-mortem examination a large tumor, weighing 1800 grammes (57½ ounces), was found within a sac which seemed to be formed by the thickened pleura. From the inner wall of the sac a grayish band passed into the pulmonary structure. The lower portion of the pleura contained about 300 grammes (9½ fluidounces) of purulent fluid, slightly blood-streaked. The mediastinal glands were enlarged. No other morbid growth could be found in any organ. On histological examination the neoplasm was found to be a spindle-celled sarcoma.

West²_{Sept. 8, '94} reports a case of primary sarcoma of the lung in a boy 11 years old. Following a wetting the child complained of pain in the chest and headache. Subsequently dyspnœa developed, stabbing pains appeared in the right chest, and emaciation

took place. The right chest bulged considerably, especially in its upper half, and there was complete dullness in this area, with absence of respiratory murmur. The case was thought to be one of pleural effusion, and 3 pints ($1\frac{1}{2}$ litres) of slightly blood-stained serum were removed by means of an aspirator. On another occasion $3\frac{1}{2}$ pints ($1\frac{3}{4}$ litres) were removed, together with considerable blood and some clots. The condition of the child steadily grew worse, the bulging of the right chest increased, and the subcutaneous tissues over the swelling became infiltrated with effused blood from dilated and ruptured blood-vessels. Œdema of the face and right leg developed, and the superficial abdominal veins became much dilated. A hard, painful mass could be felt occupying the site over the head of the pancreas. During the last two weeks of life the boy was unable to remain in a recumbent position. The right supra-clavicular glands became enlarged and indurated, and both eyes protruded considerably. Death took place suddenly, apparently from interference with the heart's action, due to the great displacement of this viscus. A post-mortem examination was not permitted, but it is believed that the case was one of sarcoma of the lung.

Bernard and Vermorel^{No. 7, '94} report a case of carcinoma of the lung, with sero-sanguinolent pleural effusion in a man, 44 years old, who for ten years had had a cough. For four months there had been loss of strength and dyspnoea, and night-sweats had set in. The right side of the thorax was immobile, with dullness on percussion, and absence of vocal resonance and fremitus. On puncture, between 1600 and 1800 grammes (51 and 57 ounces) of yellowish fluid were evacuated, but the percussion dullness persisted. Fluid re-accumulated, the chest-pains became intensified, the breathing and pulse-rate accelerated, and the patient finally succumbed. Upon post-mortem examination the right pleural cavity was found to contain about $1\frac{1}{2}$ litres (quarts) of hæmorrhagic fluid. Above the level of this accumulation, in the anterior mediastinum, was a hard, whitish tumor, the larger portion of which was upon the right side of the median line and in intimate relation with the right lung. The trachea, the arch of the aorta, and the pneumogastric nerves were involved in the neoplasm. The anterior wall of the trachea was infiltrated at its bifurcation. The hilum of the lungs was surrounded by the new formation.

The peribronchial glands were indurated and enlarged. Not one of the other viscera was affected.

Steell, of Manchester, ⁶_{Feb. 17, '94} cites a case of lymphosarcoma of the lung in a man, 49 years old, who presented pains in various joints, dullness on percussion of the whole left side of the chest, with slight displacement of the apex-beat of the heart to the left, slight cough, and blood-mixed expectoration. The development of severe febrile symptoms was attributed to an attack of influenza, which was prevalent at the time. There was general aching, a severe headache, and a few days later a pericarditic friction-sound became audible over the heart, chiefly at the apex. This murmur disappeared, but the patient became much worse and died with symptoms of œdema of the lungs. Upon post-mortem examination, in addition to an excess of fluid and a few shreds of flaky lymph in the pericardial sac, the left lung was found compressed by a surrounding pleuritic effusion. The upper lobe was collapsed, while the central portion was infiltrated with nodules of soft, white, new growth. The lower portion of the lung was in a state of acute suppurative pneumonia. The larger divisions of the bronchi going to the lower lobe contained large, white, soft, polypoid masses of new growth, which almost completely obstructed their lumen. The growth was apparently primary in the bronchial glands or peribronchial glandular tissue. The mediastinal glands were not enlarged. There was no new growth in the mediastinum.

Dumarest, of Lyons, ²¹¹_{Jan. 28, '94} reports a case of primary sarcoma of the pleura and of the right lung in a man 56 years old. During life the existence of pleurisy with effusion was recognized, and there was complaint of lancinating pain in the side. The dyspnoea was extreme, although abnormal auscultatory phenomena were absent. The temperature was not elevated, but the thoracic parietes were œdematous. There was neither cough, nor wasting, nor cachexia. The tumor was inclosed between the layers of the thickened pleura, and weighed 3.6 kilogrammes (8 pounds). It had invaded the thoracic wall and the mediastinum, and had completely destroyed half of the diaphragm. The lung was displaced and compressed.

Mirinescu and Baroncea, of Bucharest, ¹¹⁸_{Feb., '94} report a case of primary sarcoma of the lung, with secondary enlargement of the

bronchial and mediastinal glands, in a girl 14 years old. There were present fever, cough, expectoration, loss of appetite, dyspnoea, œdema and cyanosis of the face, dullness on percussion, blowing breathing, and progressive emaciation, but without râles and night-sweats. Griffon⁷_{No.10,'94} observed a case of sarcoma involving the mediastinum, the pleura, and the lung, secondary to a tumor of the breast, occurring in a woman 70 years old, and pursuing a latent course. Foà⁷³⁹_{Feb., '94} reports a case of primary carcinoma of the lung.

Siegert,²⁰_{B.134,II.2; July 15,'94}¹²⁶ as the result of histological studies, finds that primary epithelial carcinoma of the lung may arise (1) from the alveolar epithelium; (2) from the epithelium of the bronchial mucous membrane; (3) from that of the bronchial glands; while primary endothelial carcinoma may arise (*a*) from the endothelium of the superficial lymphatic vessels of the pleura, and (*b*) from the pulmonary lymphatics.

Bernard⁷_{No.23,'93} describes a case of sarcoma of the pleura in a man, 24 years old, who complained of cough, shortness of breath, and some pain in the side. Percussion over the left lung posteriorly yielded a dull note from the base to the middle of the infra-spinous fossa. The patient had lost flesh and strength and had night-sweats, but no hæmoptysis. Hæmorrhagic fluid was obtained on exploratory puncture. Thoracentesis subsequently permitted the escape of several grammes of red, thickened blood, microscopical examination of which disclosed the presence of red and colorless cells, but no other cellular elements. Later in the history of the case the veins of the left half of the thoracic wall became dilated, and the apex-beat of the heart was displaced to the right of the sternum. The dullness on percussion extended and the respiratory murmur became roughened, while vocal fremitus and resonance diminished. The symptoms thus progressed until death took place, with manifestations of cardiac and respiratory failure. Upon post-mortem examination the left pleural membranes were found adherent, and from between them a yellowish liquid exuded. On separation of the adhesions there was found a soft, whitish mass, somewhat resembling a sheep's brain, displacing and compressing the lung, which contained two or three small nodules. The adjacent intercostal spaces were infiltrated by the new formation. Several nodules were present in the pleura and

interspaces upon the right side. The tumor invaded the posterior mediastinum and intricately surrounded the aorta, the œsophagus, and the pneumogastric nerves. The diaphragm was infiltrated to a slight extent. Some glands in front of the aorta were also enlarged. No other organs were found affected.

Boyce, of Emlenton, Pa., ¹⁶¹_{May, '94} reports a case of sarcoma of the pleura in a girl 14 years old. The prominent symptoms were: pain in the side; rapid, irregular pulse; labored, painful breathing, and slight rise of temperature. An effusion of fluid took place into the left pleural cavity, which, upon puncture, was found to be blood-stained, and two quarts (litres) were evacuated. Choking spells appeared and pain in the little and ring fingers became intense, while the whole hand was slightly œdematous, the supra-clavicular and axillary glands became enlarged, and hard, adherent nodules, as large as English walnuts, made their appearance on the chest externally. The case terminated fatally, but a post-mortem examination could not be secured. Stewart and Adami, of Montreal, ²⁸²_{June, '94} relate a case of primary angiosarcoma of the upper portion of the left pleura in a man 35 years old.

Cnopf ³⁴_{Apr. 17, '94} describes a case of sarcoma of the posterior mediastinum, in a man 45 years old, with cough and rheumatoid pains in the right shoulder. Two days later he was seized with hæmoptysis and subsequently the sputum was from time to time blood-streaked. Examination failed to disclose the presence of tubercle bacilli. The temperature was, for the most part, subnormal. There was found dullness on percussion at the apex of the right lung, without abnormal auscultatory phenomena. The general nutrition was fairly well preserved. The suspicion of a mediastinal tumor was confirmed by the subsequent course of the case. Œdema of the neck and head, with marked cyanosis of the lips and ears, developed, and the case rapidly progressed to a fatal end. Upon post-mortem examination a nodular tumor, of a color between whitish gray and grayish yellow, as large as an adult fist, was found overlying the upper portion of the right lung and to a slight degree the left. Both pleural cavities contained between 200 and 300 cubic centimetres ($6\frac{1}{2}$ to $9\frac{1}{2}$ ounces) of slightly-turbid, serous fluid, which was hæmorrhagic upon the right side. The pericardial cavity contained about 100 cubic centimetres ($3\frac{1}{4}$ ounces) of similar fluid. The anterior surface of the

right lung was adherent to the tumor, from which, however, it was readily separated. The superior vena cava was compressed by the growth. At a distance of two or three cartilaginous rings above the bifurcation of the trachea, grayish-yellow nodules, varying in size from a pin-head to a lentil, were seen projecting into the lumen. On section it was found that the neoplasm had penetrated the trachea in this situation, and extended to the bronchi of the fourth and fifth degrees.

At a meeting of the Royal Academy of Medicine in Ireland, Finny¹⁶_{June 1, '94} exhibited a specimen of columnar-celled carcinoma of the mediastinum, obtained from the body of a man, 65 years old, who had complained of weakness and emaciation for two years, and of hoarseness and cough for three months, with a small quantity of muco-purulent expectoration. The left vocal band was partially paralyzed, but no tumor or inflammatory disease of the larynx could be detected. An enlarged gland was felt in the left and right supra-clavicular regions, and the percussion-note over the manubrium sterni was comparatively dull. Œdema of the right side of the neck and arm, then of the left side of the neck and of the thorax, set in, while the lower half of the body and legs were unaffected; and general cyanosis of the face, with great varicosity of the surface of the chest, pointed to obstruction of the superior vena cava. The œdema almost entirely disappeared during the last two weeks of life. Upon post-mortem examination a large, hard tumor was found occupying the anterior mediastinum and extending back to the front and left side of the trachea. Its structure was tunneled by the arteries springing from the arch of the aorta and by the ascending and transverse portions of the aorta, without involvement of these vessels in the growth; but the veins were compressed, and the descending cava, just above the opening of the azygos, was distinctly narrowed. The left pneumogastric nerve ran through the malignant growth, and was widened and flattened, but the recurrent laryngeal could not be dissected out of it, although its course past the tumor was readily demonstrable.

Meigs and de Schweinitz, of Philadelphia,⁵_{Aug., '94} report a case of round-celled sarcoma of the anterior mediastinum, in a man 21 years old, with secondary involvement of the lungs, the pleuræ, the mesenteric glands, the kidneys, the liver, the spleen, the heart,

the cerebellum, the choroid coats of the eyes, the oculo-motor and the optic nerves, and external ocular muscles. Walker²⁸²_{Oct., '93} relates a case of primary lymphosarcoma of a bronchial gland, with secondary growths in other bronchial glands and in the lung and liver, with pleurisy and pericarditis, slight parenchymatous nephritis, and left-sided pulmonary tuberculosis.

At a meeting of the Pathological Society of London, Ogle presented²_{May 18, '94} a specimen of polypoid carcinoma almost blocking both bronchi, and which, it is believed, originated from the glands of the mucous membrane. No other tumors could be found in any part of the body.

ASTHMA.

Illingworth, of West Kensington, England, ²²_{Oct. 11, '93} proposes the theory that the asthmatic paroxysm is due to a narrowing of the calibre of the bronchial tubes, in conjunction with the dilated condition of the air-cells, resulting from venous congestion of the bronchial tract, with consequent excessive accumulation of the gases of the blood in the air-cells and tumefaction of the bronchial mucous membrane by distension of the venous radicles. The effect of these pathological conditions is interference with and partial suspension of the necessary diffusion between the expired blood-gases, chiefly carbon dioxide, and the inspired air.

Einthoven⁵⁸³_{Oct. 7; Nov. 4, '93} ascribes the characteristic paroxysms of asthma to spasm of the bronchi impeding respiration. This produces an excess of CO_2 in the blood, which causes abnormal stimulation of the vagi. This action and reaction are further influenced (1) by the reciprocal effects of an accumulation of CO_2 in the central nervous system and a retardation of the circulation; (2) by the rapid production of CO_2 in the organism, in consequence of the powerful efforts required for the movements of respiration. As therapeutic agents, nicotine and atropine are recommended.

Krause, of Norway, ²⁴²_{Sept., '94} has observed good results, in the treatment of neurotic asthma, from a sojourn at the sea-coast. Of fifty-six cases thus treated, twenty-nine were completely cured. Ten others with marked emphysema were so much improved by four or five weeks of the sea-air that they were enabled to resume their various occupations. As much time as possible should be

passed out-of-doors. After getting accustomed to the air, the salt sea-baths should be taken, at first slightly warm, until they can be taken in the sea. The nervous irritation soon passes off, the congestion of the tubes becomes less, and the attacks less frequent until the cure is complete.

Thorowgood, of London, ⁶_{Aug. 11, '94} reports a case of asthma associated with bronchitis, in a woman 23 years old, in which relief was secured by removal of considerable vascular and hypertrophied tissue over the turbinate bones of the nose. A second case of asthma is reported, in a man 33 years old, with tubercle bacilli in the sputum, in which relief was afforded by the administration of an ounce (31 grammes) of a decoction of euphorbia pilulifera three times a day, with 10 minims (0.65 gramme) of spirit of chloroform.

ABSCESS OF THE LUNG.

Voje, of Oconomowoc, Wis., ¹⁹_{Dec. 30, '93} observed a case of abscess of the lung in a man, aged 28, presenting signs and symptoms of the last stage of pulmonary tuberculosis. A fluctuating swelling was found on the posterior aspect of the chest, a hand's breadth below the angle of the right scapula, upon incising which about a pint ($\frac{1}{2}$ litre) of pus and tissue-shreds escaped. Cough caused increased discharge of pus and air-bubbles. Iodine injected into the opening appeared in the expectoration. Under appropriate treatment distinct improvement took place. In a second case, in a woman 32 years old, with a tuberculous family history, who had been losing flesh for a year, had evening elevation of temperature, rapid pulse, and night-sweats, an incision into a fluctuating swelling upon the posterior aspect of the right side of the chest, below the angle of the scapula, permitted the escape of pus. Neglect of treatment on the part of the patient led to burrowing of the abscess in different directions and increased the difficulty of treatment. Ultimately, however, improvement took place, with gain in flesh, disappearance of night-sweats, return of appetite, and permanent obliteration of the cavity.

At a meeting of the Leeds and West Riding Medico-Chirurgical Society, Churton and Littlewood ²_{Jan. 13, '94} presented a girl, 12 years old, in whom two small abscesses had apparently formed in a collapsed portion of the right lung. The heart was dragged to the right, the apex-beat being close to the right nipple. The ab-

scesses were opened and drained, after excising portions of two ribs, and recovery ensued. Leech, before the same society, reported a case of gangrenous abscess of the lung, in a youth 22 years old, in the sequence of an attack of what was believed to be pneumonia of the left lung. The abscess was opened in the second interspace, at a depth of three and one-half inches from the surface, and a drainage-tube inserted. Recovery finally ensued. Irving alluded to the case of a man in whom, on the second day of an acute illness, a pleuritic rub was detected, but which soon disappeared. On the third day the man expectorated offensive dark phlegm and continued to do so for the following four months, sometimes in large quantities. At the end of this time he ejected a very large quantity of horribly-smelling stuff, and with it what appeared to be a slough of lung. After this, recovery rapidly ensued.

Apolant, of Berlin, ¹¹⁶_{Sept., '94} recommends, in cases of pulmonary abscess or other intra-thoracic suppurative conditions in which communication with a bronchus exists, the adoption periodically of an attitude, such as stooping, as will favor the spontaneous extrusion of the pus. He reports several cases in which this measure acted most happily.

ASPERGILLUS PNEUMOMYCOSIS.

Kolm, of Berlin, ⁶⁹_{Dec. 14, '93} reports the case of a man, 58 years old, who, after exposure to cold, complained of pain on both sides of the chest. He had long had cough and expectoration, the latter previously yellow, but now assuming a brownish tint. Several months before, he had an attack of copious hæmoptysis. For many years he had had a nasal discharge, and on one occasion had expelled a "tape-worm-like" membrane from the nares. On physical examination, in addition to the signs of pulmonary emphysema and diffuse bronchitis, there was found retraction over the apex of the left lung, with dullness on percussion and bronchial breathing. Attacks of intense dyspnœa occurred from time to time, and in one of these death took place. Repeated examinations of the sputum had failed to reveal the presence of tubercle bacilli. Upon post-mortem examination there was found, at the apex of the left lung, a spherical area about four by five centimetres in its various dimensions, presenting the appearances of a saturated sponge. This was bounded by a dense infiltrate, from which it was sepa-

rated by a yellowish-gray band about two millimetres thick. Within and at the periphery of the mass were numerous thrombosed vessels. The infiltrated portions adjacent to the mass were smooth, but indurated. At a somewhat greater distance, however, the sections were granular and presented an appearance like that seen in fibrinous pneumonia. This was gradually lost in the adjacent œdematous portions of the lung. A smaller circumscribed mass, of reddish-gray color, was found in the middle lobe. Microscopical examination disclosed the presence of the *aspergillus fumigatus*, in conjunction with degenerative changes.

DISTOMA.

Ino-Uye and Katsurada ²⁰⁰_{June 23, '94} report a case of pulmonary distoma in a man, 36 years old, in whom right hemiplegia, with aphasia, developed. The sputum contained eggs of pulmonary distoma. The condition of the man became progressively worse until death ensued. Upon post-mortem examination the left temporal lobe, and particularly its antero-inferior portion, was found to be swollen and yielded an obscure sense of fluctuation. On incision about 50 grammes (1½ fluidounces) of viscid, dirty yellowish-gray, purulent matter escaped. The morbid focus was circumscribed by a thin membrane of connective tissue and its interior was divided by a membranous septum into an antero-external portion, which was about as large as a child's fist, and a postero-internal portion, about as large as a hen's egg. The morbid focus occupied portions of the inferior temporal gyrus, the fusiform lobule, the hippocampal gyrus, and the uncinate gyrus. The right ventricle was distended with an excess of fluid; the floor of the left lateral ventricle was adherent to the posterior portion of the choroid plexus and the inferior surface of the left lateral part of the corpus callosum. The optic thalamus of the same side was the seat of a morbid focus, of the size of a hen's egg, containing dirty-gray, viscid, purulent matter, and bounded by a limiting membrane. Many hæmorrhages were apparent upon section of the brain. The left motor oculi nerve was atrophied and adherent to the disease-focus in the temporal lobe. The lungs were found to contain three pulmonary distomæ. The contents of the morbid foci in the temporal lobe and optic thalamus comprised pus-corpuscles, small spheroidal cells with fat-granules, disintegrated

nerve-cells and fibres, Charcot's crystals, and many eggs of pulmonary distoma.

BRONCHITIS.

Rappin, of Nantes, ¹²⁷_{Sept., '94} found, in the sputum from a case of fetid bronchitis, bacilli measuring from 0.8 to 1.5 μ long by 0.5 μ thick, with little movement, staining with aniline colors and according to the method of Gram. It was cultivable upon the usual media, but only developed the characteristic odor in cultures upon gelatin and in bouillon. It failed to produce pathogenic effects in guinea-pigs when injected subcutaneously.

Dienzaide ¹⁰³⁸_{Dec. 15, '93} reports the case of a woman, 70 years old, in whom, in the course of a capillary bronchitis, there developed paralysis of the right side of the body with aphasia, with anæsthesia of the affected parts, and believed to be due to embolism of the right carotid artery.

For acute bronchitis in children, de Holsten ³_{Jan. 10, '94} recommends calomel rubbed up with sugar of milk, and given in doses of $\frac{1}{6}$ grain (0.01 gramme) every two or three hours for four or eight doses. As the bowels are evacuated the temperature declines and the other symptoms subside.

BRONCHIECTASIS.

Peron ⁷_{No. 13, '94} reports a case of bronchiectasis with metastatic intra-encephalic suppuration in a man, 23 years old, who presented the characteristic cough and fetid expectoration. Symptoms of meningitis developed and led to a fatal ending. Upon post-mortem examination, in addition to the dilatation of the bronchi, an accumulation of pus, of fetid odor, was found in the sub-arachnoid space below the inferior vermiform process of the cerebellum; and also in the left lateral ventricle, in the posterior horn of which a small area of ulceration was found. The adjacent white substance was the seat of a yellowish, gelatinous area, of irregular outline.

Bensaude ⁷_{No. 11, '94} describes the case of a woman, 58 years old, who had had cough for five or six months, with scanty expectoration, at times blood-streaked. Later, copious hæmoptysis repeatedly occurred. On physical examination induration of the apex of the right lung was detected, together with the signs of a slight effusion into the left pleural cavity. The woman grew progressively

worse and finally succumbed. Upon post-mortem examination the right lung was found adherent at its apex, and this portion of the lung was not indurated, but elastic and soft, not crepitating or creaking under the knife. Upon section of the superior quarter of the lung a multitude of cavities were disclosed with rigid walls, all of which communicated with a bronchus.

PULMONEA.

According to Power,⁶ Aug. 18,⁹⁴ "pulmonea" is a name given by the native Peruvian miners to an affection of the chest simulating acute pneumonia in the stage of consolidation, and for which it might easily be mistaken. In these altitudes (15,600 feet) the sudden daily extremes of temperature (75° to 38° F. average—23.8° to 3.3° C.) natural to the climate and the inhalation of the irritating dust of the dry stamps of the mills and smelting-fumes make cases of pulmonea of daily occurrence. Miners with pulmonea will present themselves, complaining of inability to work, of a dull pain under the heart and between the shoulders, of cough and sometimes blood-spitting, and distress of breathing. Inspection of the chest shows increased and quickened breathing. There is increased vocal fremitus, with marked dullness on percussion, and increased resonance over both lungs at the back of the chest,—under, as it were, the seat of pain. Sometimes roughened breathing can be heard, but not tubular. However, there are no febrile symptoms, and the absence of these and the tubular breathing are the only differences between the two affections. In necropsies of two men, previously treated for pulmonea, who had died from the effects of mining accidents, the glands in the posterior mediastinum were found greatly enlarged, inflamed, and thickened, forming a compact mass in a situation which would just correspond to the seat of pain. The condition, it is believed, is caused by the irritating matter continually inhaled by the men. With regard to treatment, painting the back with iodine, and syrup of iron iodide given internally, with a few days in the fresh air, will remove all the unpleasant symptoms, but not the physical signs.

PULMONARY HÆMORRHAGE IN THE NEWBORN.

Prescott, of Boston,⁹⁹ Mar. 8,⁹⁴ has reported the case of a newborn infant, delivered with forceps and slightly asphyxiated at birth,

which, forty-eight hours after delivery, appeared rather dull and slightly cyanosed, dying eight hours later. Post-mortem examination disclosed a slight hæmorrhage in the dura on the right side, corresponding to a large ecchymosis made by the forceps behind the right ear. Both the peritoneal cavity and the anterior mediastinum contained a small amount of blood, the thymus gland being especially infiltrated. Each pleural cavity contained a slight amount of hæmorrhagic exudation, the pleural surface of the right lung over the lower lobe showing in places a fine, fibrinous exudation, and the anterior lobe of the right lung and the lower portion of the upper lobe being consolidated. The pleural surface of the lung was sprinkled with fine ecchymoses. On section the consolidated lung was dry and smooth and of a dark-red color. The granular appearance of ordinary croupous pneumonia was absent, but the lung was not so smooth as it is in cases of purulent or hæmorrhagic consolidation. The bronchi and the trachea contained bloody mucus. The left lung presented almost the same condition as the right. The pericardial cavity contained a considerable quantity of serum; the visceral pericardium was sprinkled with a number of small hæmorrhages, and these were also to be seen in the myocardium. The muscular tissue of the heart displayed numerous ecchymoses. The stomach contained a considerable amount of dark blood. The liver was large and pale, and on section presented numerous opaque, slightly-reddish foci, of an average size of half a millimetre, which contrasted sharply with the surrounding parenchyma. The spleen was enlarged and, on section, homogeneous and rather soft. Examination of cover-slips, prepared from the lungs and from the blood in the heart and from scrapings from the other organs, disclosed the presence of typical diplococci with well-defined capsules in large numbers. In cultures prepared from the lungs, heart, liver, spleen, and kidneys, diplococci alone developed. A rabbit inoculated with scrapings from the consolidated lung died in three days, from typical diplococcous septicæmia. Examination of the consolidated portions of the lung showed an absence of the typical appearances of fibrinous pneumonia. The consolidation was almost entirely due to hæmorrhage into the lungs. In places there were small amounts of fibrin; usually this was mingled with red corpuscles, but in some places it was found, in the alveoli, almost alone. Here and there a

few leucocytes were found, together with the red corpuscles, but the number of these was exceedingly small. Diplococci were everywhere present in enormous numbers.

Legry ⁷_{No. 27, '93} has reported the case of an infant presenting intra-uterine pleuro-pulmonary infection. The child lived for ten hours, and respiration was never completely established. The surface of the pleura was covered by false membrane, and each pleural cavity contained half a teaspoonful of sero-sanguinolent fluid. Bacteriological examination of this fluid and of the false membrane disclosed the presence of streptococci. No other organ presented any appreciable microscopical change. The mother had suffered with an acute vaginitis and premature rupture of the membranes had taken place, and it is believed that the infant had been infected through the amniotic fluid.

RUPTURE OF THE LUNG.

Pyle, of Washington, D. C., ⁹_{Feb. 24, '94} relates the case of a boy, 10 years old, who was run over by a heavy cart, and when seen was in a state of extreme shock, with a weak, almost imperceptible pulse, shallow and rapid respirations, and subnormal temperature. No signs of external injury of the thoracic cavity could be detected. Marked subcutaneous emphysema, however, existed upon the neck and side of the face, as well as upon the left arm. The chest was securely strapped with overlapping bands of adhesive plaster, extending nearly around its circumference, and a muslin binder was applied. Subcutaneous injections of strychnine and whisky were resorted to and hot-water bottles applied, while the patient was wrapped in blankets. To further control respiration morphine sulphate was given, in doses of $\frac{1}{16}$ grain (0.004 gramme), at sufficient intervals to keep the rate below 20. The patient soon reacted and steadily improved, the temperature reaching normal on the eighth day. It is believed that, as a result of the violent traumatism, rupture of the lung occurred, with extravasation of air into the interstitial connective tissue.

Comte ¹⁹⁷_{Mar. 29, '94} reports a case of rupture of the lung resulting from uncomplicated traumatism of the chest-wall in a man, 37 years old, who was struck a violent blow by the beam of a machine which he was handling. The injury was followed by a considerable amount of shock and urgent dyspnoea. An hour

later profuse hæmoptysis set in and continued intermittently for the next twenty-four hours. No lesion of the integument and no fracture of the ribs could be detected. The temperature was slightly elevated. Tubular breathing was heard over the right supra-spinous fossa and large, high-pitched râles over both sides of the chest. The patient died on the seventh day, apparently from asphyxia. Upon post-mortem examination no lesion of the superficial structures was found. The apex of the right lung was adherent and the overlying pleura much thickened. At the junction of the upper third with the lower two-thirds of the lung a deep, extensive rent was found. The adjacent pulmonary tissue was consolidated. The laceration was situated on the external border of the lung, where the pleural adhesions were firmest, and there were evidences, also, of old tuberculous disease.

PULMONARY INFARCTION.

Massey, of Philadelphia, ¹¹²_{Dec., '93} has reported a case of symmetrical hæmorrhagic infarct of both lungs in a girl, 18 years old, of good family and personal history. During life a loud, blowing systolic murmur was heard over the heart, transmitted to the axilla, and distinctly heard posteriorly. A second attack occurred some four months later, with similar symptoms. Upon post-mortem examination the heart was found enlarged. The mitral orifice was patent, but its valves were thickened and irregular, particularly along the line of contact. The aortic valves were likewise thickened. At the apex of each lung anteriorly was found a perfectly-developed hæmorrhagic infarct, measuring about two inches across the base and extending into the pulmonary parenchyma a like distance.

NON-TRAUMATIC SUBCUTANEOUS EMPHYSEMA.

Brockbank, ⁶_{Apr. 7, '94} has reported the case of a youth, 17 years old, who came under observation on account of a slight cough and of swelling of the face and chest. It was related that four days previously, on awakening, the patient had felt a pain in the left mammary region, with a point of maximum intensity about one inch outside and below the nipple. The pain was sudden in onset and not preceded by coughing. It seemed to come from the back, was sharp, and restrained breathing. After the pain had con-

tinued for some hours it was suddenly observed that the right cheek was swollen. The breathing had by this time become difficult, and there was a desire to cough, which was restrained by the intense pain about the nipple. The left cheek soon became swollen, the eyelids a little later, and, finally, the front of the neck and the chest became involved. The patient was now suffering from great dyspnoea and much distress. An incision three-fourths of an inch long was made down the centre of the manubrium sterni, and air could be heard to escape. This was followed by considerable relief, but the swelling did not decrease much, and the patient felt ill and was short of breath. After a little while the swelling permanently subsided. On physical examination there was found to be impairment of the percussion resonance at the apex of the left lung, but no abnormal auscultatory phenomena could be detected. There had been an attack of acute left-sided pleurisy eight years before, and the youth had suffered with repeated abscesses at different times. There was a family history of pulmonary tuberculosis, but tubercle bacilli could not be found in the sputum. The first sound of the heart was impure and low-pitched at the apex; the second was accentuated. At the aortic cartilage there was a faint systolic murmur, the second sound being normal. It is believed that, as a result of ulceration of a suppurating mediastinal gland through a bronchus, air found its way into the subcutaneous tissues; the opening closed in a short time, and the air was absorbed.

MEDIASTINITIS.

Middleton, of Glasgow,²¹³_{July, '04} has reported a case of purulent necrotic mediastinitis, with pericarditis and double empyema, resulting from suppuration of a submaxillary gland in a child 11 years old. The child complained of pain in the front and left side of the chest, having, a week before, presented a small swelling under the lower jaw on the right side, which was supposed to have originated from a bad tooth. There was dyspnoea, acceleration of pulse and respiration, and slight elevation of temperature. Continuous with the swelling of the neck there was marked œdematous swelling of the upper part of the thorax on both sides, with dullness on percussion. Over this area an emphysematous crackle was detected on pressure. Pericardial friction was audible

all over this area, and in the left lateral region and back pleural friction was also heard.

NECROSIS OF LUNG.

Nikitin, of St. Petersburg, ²¹_{Oct. 23, '93} observed a case of partial necrosis of the lung, of traumatic origin, in a boy, 13 years old, who had fallen upon a bench, striking the left side of the chest. In addition to pain, there were slight febrile movements and cough, and subsequently an effusion of fluid into the left pleural cavity. The accumulation finally became so large that an exploratory puncture was made, disclosing the presence of offensive, thin pus. Resection of the sixth rib in the left axillary line gave exit to 500 cubic centimetres (1 pint) of the same kind of fluid, the continuous secretion of which persisted until a fragment of gangrenous pulmonary tissue was finally extruded.

PNEUMOTHORAX.

Laache ³⁶⁹_{Dec. 12, '93} relates the case of a man, 47 years old, in perfect health, in whom pneumothorax suddenly appeared while at dinner, after the swallowing of a fish-bone, death occurring fifteen days later. Upon post-mortem examination two perforations of the œsophagus were found, two centimetres below the level of the bifurcation of the trachea, one of which communicated with the left pleural cavity, which was the seat of a pyopneumothorax. The left lung was also injured, and it is thought quite probable that this injury was responsible for the presence of air in the pleural cavity.

Shaw, of Bristol, Eng., ¹³¹_{Dec., '93} has reported two cases of pneumothorax arising from unusual causes. The first occurred in a man with signs of advanced pulmonary tuberculosis complicated by pneumothorax and emphysema of the upper part of the chest-wall. After death it was found that the first rib was necrosed, and the rough end had torn the lung-tissue. The second case occurred in a girl, who presented diarrhœa, a distended abdomen, and signs of pneumothorax. After death the lung was found collapsed, with septic abscesses in its substance. The lateral sinus on one side was full of grumous, putrid clot, and this was undoubtedly the cause of the pyæmia. There were no symptoms during life pointing to disease of the ear.

EMPYEMA.

James, of Edinburgh, ³⁶_{Feb., '94} has reported two cases of empyema, one of four months' duration, in a tuberculous man 25 years old, in which pus was being discharged through a bronchial tube. A free incision was made between the sixth and seventh ribs in the scapular line, 120 ounces (3600 grammes) of pus being evacuated. The patient steadily improved after the operation, but the discharge continued and the compressed lung failed to expand. At a later date, the third, fourth, fifth, sixth, seventh, and eighth ribs on the right side were resected, from one and one-half to two and one-half inches of each being removed. Thereafter the patient's condition improved notably. In the second case, in a man 32 years old, the pus obtained, upon exploratory puncture, presented a peculiar appearance, like that of white cream. Upon microscopical examination the fluid was found to contain pus-cells, all markedly degenerated.

MISCELLANEOUS.

At a meeting of the Society for Internal Medicine of Berlin, Oestreich ⁴¹_{Apr. 10, '94} presented the larynx, trachea, and lungs from the body of a woman, 47 years old, affected with general trichinosis, and in which the trachea was narrowed at its bifurcation. The stenosis affected the left bronchus most profoundly. Upon the distal side of the narrowing the bronchi were dilated in a cylindrical and saccular form and contained purulent secretion. The adjacent bronchial glands were soft and small. No definite cause for the condition could be assigned, though it was believed to be syphilitic in origin. Gemmell and Buchanan ²¹³_{Aug., '94} report the case of a woman, 31 years old, with a probable history of syphilis, who presented ulceration of the trachea and bronchi, fibroid induration and caseous nodules at the bases of the lungs, enlargement of lymphatic glands, and gummata in the liver.

Josue ⁷_{No. 9, '94} describes the case of a man, 36 years old, in whom gangrenous changes in a bronchial gland were followed by ulcerative communication with the right bronchus, the œsophagus, and right pleural cavity, gangrenous broncho-pneumonia developing at the base of the right lung.

Lafarelle ²⁵_{Feb., '94} reports a fatal case of perirenal abscess, in a woman 31 years old, which ruptured into a bronchus, and during life was mistaken for a purulent pleurisy. Netter, of Paris, ¹⁴_{Nov. 5, '93}

reports a case of actinomycosis of the lung, with spontaneous perforation through the chest-wall, in which recovery followed treatment with large doses of potassium iodide administered for a long period.

Gluzinski, ⁵⁶⁹_{No.25,'93} ⁹⁹_{Aug.23,'94} has studied experimentally the pathological changes induced by blood effused into the lung. He found, twenty-four hours after the occurrence of the extravasation, desquamation of the epithelium of the alveoli and the finest bronchioles, an outpouring of leucocytes, and a peribronchitis. About the sixth day the lung became atelectatic, while the peribronchial inflammation was more manifest, and sometimes desquamative pneumonia appeared.

Desplats, of Lille, ²²⁰_{June 9,'94} describes the case of a woman, 32 years old, presenting marked scoliosis, in which transitory and recurrent atelectasis of the inferior lobes of both lungs was induced by gaseous dilatation of the gastro-intestinal tract, death ultimately resulting from asphyxia. Lancereaux, of Paris, ¹⁰_{Nov.21,'93} calls attention to the occurrence of pulmonary anthracosis in polishers of carbon points employed for arc electric-lighting purposes. Brockbank, of Manchester, ⁹⁰_{July,'94} has reported a case of acute œdema of both lungs from immersion in canal-water, occurring in a man 39 years old.

At a meeting of the Anatomical Society of Great Britain and Ireland, Bowles ²⁷⁷_{Jan., '94} showed a specimen of a right lung with four lobes from a case of pulmonary tuberculosis. What should have been the posterior lobe was divided into two, its apex appearing as if cut off from the base and the division going through almost to the root of the lung. The left lung had three lobes, the lower being divided into two parts, although the division did not penetrate so deeply into the substance of the lobe as the abnormal division on the right. Reinhold, of Freiburg, ³⁴_{Nov.7,'93} cites a case of agenesis of the left lung in a woman 32 years old. During life the condition was believed to be due to fibroid changes consequent upon a pneumonic or atelectatic process early in life. Tikhomiroff ¹²¹_{Apr., '94} reports a case of congenital absence of the left lung, in a woman 24 years old, without other abnormality.

Hogner, of Boston, ⁵⁹_{Mar.3,'94} describes an instrument which he designates the stethokyrto-graph, intended for making measurements of the chest.

Denison, of Denver, ⁵⁹_{Feb. 10, '94} describes an instrument devised by him for the inhalation and exhalation of air of varying pressure. The tension of the air is increased at will, from an easy to a more difficult use of the instrument, according to the need and ability of the patient.

Güttinger, of Zurich, ⁷⁴³_{Aug., '94} has also invented a pneumatic apparatus, and Charles Forbes ²_{June, '94} a pipe inhaler for eucalyptus or other volatile drugs.

DISEASES OF THE HEART AND BLOOD-VESSELS.

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DISEASES OF THE BLOOD-VESSELS.

Fat-Embolism.—Ribbert, of Zurich, ²¹⁴_{Aug. 1, '94} in a lecture on fat-embolism, gives the results of a recent study of several cases of this condition. The source of the fat in many instances is the bone-marrow, but in some it is the subcutaneous fat or fat in other parts of the body, and in rare instances it comes from the liver, the brain, or disintegrated thrombi. The most frequent cause of the condition is trauma, more rarely inflammation or degeneration. In bones, fracture is the usual cause, but osteomyelitis may also produce the symptom. The fat upon entering the blood is first carried to the lungs, and the most of it remains there, but a portion traverses the pulmonary capillaries and finds its resting-place in the brain, the kidneys, the myocardium, or other organs. If there is an abundance of fat and a high arterial pressure, there may be extensive blocking of the pulmonary capillaries. This was illustrated in the case of a young man who was struck by a weight of several hundred pounds that fell from a considerable height. He sustained a fracture of the left tibia and fibula, and died two days later. There was a most extensive and intense fat-embolism. In the worst cases it may be supposed that about half of the capillaries of the lungs are occluded, but, when we consider that the blocking up of numerous arteries involves other vascular areas which are not themselves the subject of embolism, it is plain that in many cases far more than half the pulmonary circulation is impeded. As a result of the embolism there are very frequently small ecchymoses in the lungs, but rarely extensive hæmorrhages. Pulmonary œdema has also been regarded as a result of the embolism, but experiments have made it seem more likely that this œdema is the result of the death-struggle. In the kidneys the fat occupies for the most part the glomeruli, whose coils are seldom

completely, but often in larger part, distended with fat. In the brain ecchymotic hæmorrhages occur. The closure of the blood-vessels in the myocardium by the fat results in a fatty degeneration, which sometimes can be detected macroscopically in the form of dull spots. The author noticed this twice in his seven cases. That extensive fat-embolism may have a fatal influence has been shown experimentally. In an animal it is estimated that death will result if there is slowly injected into the veins an amount of fat equal to three times that contained in the thigh of the animal. If the injection is made more rapidly a smaller amount will cause death. Such large quantities of fat can seldom be set free in the case of human beings, and death can rarely be ascribed to fat-embolism alone. Mech has lately collected fifteen cases in which every other cause of death could be excluded. If a large part of the pulmonary circulation is blocked up, the disturbance may be sufficient to cause death. Scriba was of the opinion that all the fatal cases of fat-embolism were the result of changes in the central nervous system, but this opinion is too extreme; for in one of the author's cases the brain was found to contain no fat, and, if the pulmonary circulation is very nearly cut off, that alone might be sufficient to cause a fatal cerebral anæmia. Whether the cardiac lesions could alone produce death is questionable, for they are never found apart from embolism of the lungs and of the brain.

Embolism of the Abdominal Aorta.—Matignon¹⁸⁸_{Apr. 15, '94} reviews our present knowledge of embolism of the abdominal aorta, and has collected 25 cases, of which 12 occurred in men, none of whom were under 20. In the majority of the cases the embolism occurred in connection with the infectious diseases usually associated with an endocardial lesion. In 6 cases it followed acute articular rheumatism; in 5, puerperal pyæmia; in 4, erysipelas; once each, typhoid fever, pneumonia, and syphilis; in 4 there were endocardial lesions of indeterminate character. The usual seat of the embolus is the bifurcation of the vessel, and it may partially or completely occlude one or both of the common iliacs. The symptoms vary somewhat in different cases, depending chiefly upon the degree of occlusion of the vessels. Their onset is sudden, and there are constant and violent pains in the lower extremities, paraplegia, cessation of pulsation in the arteries of the lower limbs, lowered temperature of the legs, and rapid trophic

change, resulting in gangrene. The prognosis is very grave, 23 of the 25 cases described having died, most of them within four days after the onset of the symptoms. Treatment can hardly be expected to be of much avail.

Narrowing of the Aorta.—G. G. Cottam⁶⁶³_{Jan., '94} reports a rare case of co-arcetation of the aorta associated with aortic stenosis and regurgitation. The autopsy showed a pericardial adhesion near the apex of the heart, the left ventricle being much dilated, its walls thinned, and the right heart being normal in all respects. The aorta was much diminished in calibre in its first part by the thickened intima being contracted in portions. There was a patch of fibrous tissue, irregularly triangular in shape, extending along the cardiac side of the ascending aorta, from the bulb to the commencement of the second part of the arch, the base of the triangle being at the proximal end. Involved in this process, apparently by contiguity, were two out of the three aortic leaflets, these being rendered functionless, and increasing the stenosis by their thickened inelastic edges. No previous history of the patient could be obtained.

Etiology of Arterio-sclerosis.—Parkes Weber⁵_{Sept., '94} states that (if a somewhat vague suggestion be permissible) one of the most probable causes of arterio-sclerosis is, perhaps, what may be termed "excess," which, in its sometimes-necessary and often long-continued forms, seems, in the present state of our knowledge, to have the greatest share in the production of arterio-sclerosis. Such excess consists merely in a "strained" manner of living, and by no means always implies an expression of reproach. It may be excess in physical labor; it may be excess and irregularity in mental work, including anxiety and worry; it may be the habitual taking of too much or too little food. Such influences, or rather combinations of them, seem to be likely factors in the production of arterio-sclerosis. They can act on a single individual or cumulatively, through several generations, on a family. On the whole, however, although such hypotheses seem very tempting, it must be admitted that the etiology of arterio-sclerosis remains, as yet, uncertain. The condition must still be regarded as a primary one in pathology, though in some way allied to some of its alleged causes.

Infectious Arteritis.—Poursain,¹²⁶_{July 15, '94} in a thesis on this subject,

states that most infectious maladies may cause acute or chronic arteritis, important among these being typhoid fever, variola, malaria, and syphilis. Arteritis is but rarely produced as a direct result of the microbe which causes the initial malady, but in most cases is due to the toxins produced by the specific microbes. The lesions are variable. We may have plastic or vegetating forms, suppuration, fatty or amyloid degeneration, and such new growths as tubercle or syphiloma. In the large arteries there may be circumscribed lesions, and we may distinguish endarteritis, mesarteritis and periarteritis. In the smaller vessels this differentiation is not possible, the lesion being total and diffuse. Here the dominant phenomena are vascular thrombosis and its consequences. Gangrene by vascular occlusion is quite frequent. In infectious arteritis of the larger arteries the local phenomena are clinically obscure; sometimes we find symptoms of septicæmia or pyæmia. Whatever the cause, infectious arteritis is a condition the consequences of which, either immediate or secondary, are of considerable importance.

Thrombosis of the Femoral Vein, with Gangrene of the Foot.

—Galliard ¹⁴_{May 20, '94} has reported a case of gangrene of the foot resulting from thrombosis of the femoral vein, in a female patient, aged 27, who was suffering from pyloric cancer. While surgeons have learned that ligature of the femoral vein at the bend of the thigh may cause gangrene of the foot, physicians have seldom seen this result from venous thrombosis. The autopsy showed that the arteries of the involved limb were perfectly normal.

Syphilitic Obliteration of the Superior Vena Cava.—Merlin ⁶_{Apr 23, '94} reports a case of obliteration of the superior vena cava. His patient was a man, aged 34, who, after a strain, was affected with a swelling of the face, which spread over the whole head; the cheeks were puffed out and œdematous, the eyes bulging, the tongue swollen so that the mouth could hardly contain it, the œdema of the neck was great, the jugular veins were dilated, the voice was cavernous, cough frequent, and deafness complete; the upper extremities were much less swollen than the face or trunk; below the umbilicus there was no œdema. Although the patient denied syphilis, he was ordered 1 drachm (4 grammes) of potassium iodide a day, and began to improve on the second day. He was cured in a month, and has now remained well for four years.

Diffuse Phlebitis Due to Latent Cancer.—Gouget⁷_{No.13,'94} reports a case of very general phlebitis of eight months' duration, resulting from a cancer which, up to the time of the autopsy, presented no other symptoms. The phlebitis, which kept on progressing for eight months, was the only apparent disease. The cancer involved the smaller curvature of the stomach and gave rise to no physical signs nor symptoms other than the phlebitis. There being no history of any infectious malady nor any toxic cause for the phlebitis, and tuberculosis being excluded, the diagnosis of cancer was made during life as being the sole probable explanation of the phlebitis. The physical examination revealed nothing but a small and somewhat painful gland in the right axilla, which seemed to be due to lymphangitis.

Rupture of the Portal Vein.—Lévi⁷_{No.3,'94} reports a case of spontaneous rupture of the portal vein in a man, 72 years old, who was the subject of a general arterio-sclerosis, affecting especially the heart and the kidneys. He was addicted to the use of alcohol, and the liver was somewhat cirrhotic. Thirty-one hours before his death the patient was returning from stool, where he had made vain efforts at defecation, when he was taken with severe abdominal pain and collapse. At the autopsy it was found that a fatal hæmorrhage had taken place through the portal vein, which had, near the hilus, a minute ulceration about the size of the head of a pin.

MYOCARDIAL DISEASE.

Dilatation of the Interstitial Spaces of the Myocardium.—Maurice Letulle⁷_{No.25,'93} describes a reticulated condition of the myocardium observed by him in the case of a woman afflicted with mitral obstruction and regurgitation, who died, at the age of 40, after eighteen months of chronic asystole. The interstitial spaces of the myocardium were found to be dilated without signs of an inflammatory process. The author's explanation is that a chronic interstitial œdema had stretched apart the muscular fibres, and that the condition was a result of venous and lymphatic stasis.

Treatment of Fatty Overgrowth of the Heart.—Schott²_{Aug.18,'94} says, in regard to fatty heart (*cor adiposum*), that, although there are no certain signs of this condition, there are several symptoms, such as the general state of the patient, the condition of the heart-sounds, the cardiac rhythm, etc., which make the diagnosis very

probable. Often this fatty deposit in and about the heart cannot be distinguished from fatty degeneration. The object of dietetic treatment is to diminish the amount of fat. There is no means of making collections of fat disappear from selected portions of the body. The fat about the heart disappears last in starving animals. Purgative measures are harmful, and the doubtful effects of the iodides are often further obscured by other symptoms produced by them. If anæmia, diabetes, gout, and especially arterio-sclerosis be present, dietetic treatment must be very cautiously employed. Any considerable loss of weight must be carefully guarded against. Patients who have lost weight in consequence of treatment by mineral waters and dietetic restrictions often develop signs of cardiac weakness. Alcoholic beverages must be restricted. It is probable that the loss of weight which occurs when the amount of fluid ingested is diminished is really due to impaired appetite. The author thinks that his treatment by means of methodical exercises and baths (see p. B-44) may be carried out with benefit and without the risks attending the other methods. Unpleasant symptoms may be removed without the patient losing weight. When the heart has gained strength, efforts may be made to diminish the weight. Any rise of temperature is a contra-indication. Moderate exercise in the fresh air is useful, but overexertion may produce unpleasant symptoms. He concludes that (1) the reducing treatment should be adopted cautiously and only in young individuals; (2) too rapid loss of weight must be avoided; (3) general diseases and senile manifestations are, at least at first, a contra-indication to the reducing treatment; (4) the fatty heart may often be treated successfully without loss of weight; (5) the mechanical treatment is the best.

Fragmentatio Myocardii.—Aufrecht ³⁴_{Feb. 6, '94} reports a case of fragmentation of the left ventricle which he regards as of primary independent occurrence. There was no other change in the muscular fibres. The right ventricle was hypertrophied and dilated, as a result, he believes, of the weakness of the left ventricle, due to the fragmentation of its muscular fibres. Oestreich ³⁴_{Feb. 6, '94} regards *fragmentatio myocardii* (*myocardite segmentaire*) not as a post-mortem phenomenon, but as a result of the death-agony, and not in itself a cause of death.

The Tolerance of the Heart to Injuries.—Graham ¹⁸⁶_{Nov., '93} states

that he saw, at a meeting of the Pathological Society in New York City in the winter of 1866-67, a human heart with what was evidently an old-fashioned, spherical rifle-bullet, considerably flattened, imbedded in the wall of the right auricle. On the inside the endocardium was perfectly smooth, giving no evidence of the foreign body on the other side. On the outside the tissues were closely adherent all around the circumference of the bullet. The man from whom this specimen was obtained had lived many years after receiving the wound, and died from another cause. Bremme¹⁴_{Jan. 8, '94} reports an autopsy made in 1892 upon a soldier wounded in 1870. The man had recovered completely from his wound, and remained well until attacked by a double pneumonia. At the autopsy it was found that the bullet had made a transverse fissure in the wall of the aorta two centimetres in length, the irregular borders of which were about two millimetres apart from each other.

ENDOCARDITIS.

Infectious Endocarditis.—Pineau²⁰³¹_{'94} discusses the clinical varieties and the pathogeny of infectious endocarditis. The causes are multiple, the microbes capable of exciting it are numerous, and there is no fixed relation between the clinical forms, the pathogenic agents, and the lesions. Besides the cases of infectious endocarditis there are others of toxic origin whose nature has not been strictly defined, but the possibility of whose existence we may admit. Cases in point are endocarditis due to the toxins of microbes (diphtheria) or poisoning from lead, alcohol, or poisons originating within the economy, as in gout or diabetes. It is probable that cases of malignant infectious endocarditis occurring in association with rheumatism are due to secondary infection, as are those occurring in the infectious diseases, the pathogenic agent of which is as yet unknown, such as scarlet fever, variola, and measles, and of all those not invading the blood, such as diphtheria. As for the cases of endocarditis associated with chorea and erythema nodosum, it is probable that they are due to multiple and varied infections.

Pevzner¹²⁶_{Jan. 15, '94} has observed 19 cases of acute endocarditis; 7 were of the ulcerative variety, 11 fibrinous. He concludes that there is no etiological difference between the ulcerative and fibrinous forms, for in both the most frequent agents of infection are the

staphylococcus aureus, the streptococcus, and the pneumococcus. In a case of generalized tuberculosis with fibrinous endocarditis Pevzner found tubercle bacilli on the valves, but he properly raises the question whether they may not have been simply deposited by the blood upon the endocardium without having been themselves the cause of the endocarditis.

E. Heyder ²⁴_{May 13, '94} reports a fatal case of gonorrhœal endocarditis, and states that thirty-one cases of gonorrhœa with cardiac complications have been reported by various observers. Leyden ⁶_{Sept. 30, '93} formerly published a case of gonorrhœal rheumatism, chronic gonorrhœa, and epididymitis, which ran a course characteristic of malignant endocarditis and, ending fatally, furnished, from the vegetations on the cardiac valves, a pure culture of the gonococcus, unmixed with any form of bacteria. Since that time he has carefully examined every case of ulcerative endocarditis with regard to its bacterial relations, ⁴¹_{July 16, '94} and in one fatal case, in which the endocarditis was associated with pneumouia, the autopsy disclosed diplococci upon the endocardium, which he cultivated and demonstrated by the inoculation of rabbits. In all, the author has carefully investigated six cases of articular rheumatism with fatal heart complications. In the first the patient was a workman, 20 years old, with a history of rheumatic fever and consequent valvular lesion. Three weeks before entering the hospital, he was taken with rheumatic sore throat and pains in the knee and ankle. Improvement followed the use of salicylic acid, but dyspnœa and moderate fever supervened with a systolic and diastolic cardiac murmur. After death there were found, upon the vegetations of the endocardium, small, round cocci arranged like diplococci. This seemed the more striking inasmuch as the endocarditis was not of a malignant character. The second case was a servant-girl, of 18 years, with severe chorea and pains in the ankles and knees, but no cardiac murmur. After death there were found endocarditis verrucosa, pericarditis, and myocarditis, with collections of the same round diplococci as in the first case. In the third instance, a laborer, of 20 years, had ulcerative aortic and mitral endocarditis with renal infarction. No pure culture could be obtained, but the already-described diplococci were found. The fourth and fifth cases were negative as to the discovery of any living bacteria. In the sixth case the examination of the cultures gave positive results.

Diplococci were grown upon the fluid drawn from an ascitic patient. The author is much inclined to regard these diplococci as closely related to articular rheumatism because they occur in the constant form of diplococci, and that a somewhat characteristic one, and, furthermore, because repeated attempts at cultivation of the cocci, with the exception of the last case, gave no positive result, which in itself is a proof that they were not the ordinary well-known streptococci. The form of endocarditis described answers in its symptoms and course completely to the rheumatic form, and the cocci are like those described by Goldscheider and Sahli. It is true that we do not yet know the organism which carries the infection of articular rheumatism, but Leyden is inclined to suppose that the diplococci which he found are associated with that disease.

Bignami ¹⁵_{Aug., '94} reports five cases of endocarditis, examined in the Pathological Institute of Professor Marchiafava, which, as could be demonstrated by microscopical examination and cultivation, originated in the diplococcus of pneumonia. The first case is noteworthy, as it led to a communication between the aorta and the pulmonary artery. Bignami quotes the important researches of Netter and Weichselbaum, and corroborates their statement that endocarditis, from the presence of pneumococcus in the right ventricle, is far commoner than the forms due to other causes. Of twelve cases of pneumonic endocarditis he observed it in two.

Etienne, of Nancy, ¹⁴_{Jan. 24, '94} reports a case of infection with the bacillus coli communis, in the course of which a mitral endocarditis developed. The bacilli found on the surface of the diseased valve bore the objective characters of the colon bacillus except that they did not coagulate milk in tubes; but in flasks, where the surface was more extended, the same microbes did coagulate milk in two days' time.

Lloyd and Riesman ²⁴²_{Oct., '93} reported two cases of infectious endocarditis, with general septicæmia, complicated with multiple neuritis. The first case was in a man who was admitted to the hospital with a typhoid type of fever which had continued three months and was complicated with multiple neuritis. The diagnosis of typhoid fever was excluded; the neuritis was irregularly distributed; the patient gradually developed an aortic regurgitative murmur with water-hammer pulse; later a purpuric eruption

appeared. A diagnosis was made of infectious endocarditis with secondary septic neuritis. The autopsy confirmed the diagnosis. The second case, also in a man, simulated typhoid fever, with the yellow-colored stools. At the post-mortem, multiple abscesses in the brain, a large embolus in the left brachial artery, and an infarct in one kidney were found, depending upon a giant growth of vegetations as large as a pullet's egg, attached to the inner coat of the aorta, and overhanging the orifices of the innominate, carotid, and subclavicular arteries. In the discussion Dana said that he regarded the septic origin of neuritis as of much importance. He cited the case of a young man with symptoms of rheumatism not responding to antirheumatic medication. Neuritis followed in two or three weeks, affecting all extremities.

J. S. Green⁹⁹_{July 7, '94} reported a fatal case of acute endocarditis simulating multiple neuritis. Gorvitz²⁰³¹_{'94} describes three cases of a rare form of infectious endocarditis peculiar to children. Its onset is insidious, its progress slow; the heart and other viscera are little disturbed, and the patient may recover, but with an organic lesion of the heart.

Vidal and Bezançon⁶_{Apr. 23, '94} presented to the Société Médicale des Hôpitaux the heart of a rabbit on the mitral valve of which was developed a yellowish, granular, friable vegetation the size of a large pea. Smaller vegetations also existed and the heart was greatly hypertrophied. The blood collected from the heart-cavities yielded pure cultures of a streptococcus presenting all the characters of the micro-organism which had, sixteen days before death, been introduced into the areolar tissue of the animal's ear, and which had determined the endocarditis. There had been no valvular traumatism and no intra-venous injections had been made.

Londe and Petit³⁶_{Sept., '94} report the case of a girl, with valvular tuberculosis, who died at 25 years of age. At the autopsy the bases of the lungs were found to be full of old caseous nodules. The heart was much affected, the tricuspid valve was incompetent, and on the mitral valve were found several vegetations of the size of lentils. Microscopical investigation of the vegetations showed only a few tubercle bacilli, chiefly on the surface, close to their junction with the endocardium. Inoculation of a guinea-pig proved successful. (See Pevzner, p. B-8.)

VALVULAR DISEASES.

Heart Disease in Children.—Sturges has delivered three valuable lectures ⁶ on heart-inflammation in children. The early diagnosis of heart-inflammation in children is among the most difficult problems of practical medicine, at first depending largely upon the presence or absence of pericardial rubbing. The disease occurs chiefly in connection with rheumatism. After 6 years of age it is almost always of rheumatic origin, yet the rheumatism is often ill-expressed in the way of arthritis and sometimes spares the joints altogether. The rheumatic heart-inflammation of children when pericardial is always endocardial as well; and when endocardial is extremely likely, with the recurrence of rheumatism, to involve the pericardium also. The rheumatic carditis of childhood may be divided into the active, the passive, and the chronic forms. Passive carditis is free from cardiac pain or distress, and, but for auscultation and the facial aspect, might often escape notice in the course of rheumatism. It is, in fact, the form of carditis which is commonest in the acute rheumatism of the adult, but it differs in two points,—one that the attending joint-pain is less acute, the other that there is much higher probability of acute carditis supervening. In chronic carditis (or pericarditis) the amount of effusion may be measured from day to day and week to week, alternately increasing and decreasing, with no active distress, no pyrexia, nor any other suffering than that which is due to some dyspnœa. It is not special to childhood, but the constant alternations in the amount of fluid, which eventually may disappear altogether, and the rarity of signs calling for paracentesis are its distinguishing features at that time of life. Active or acute carditis has, for physicians, the greatest interest. In the course of a slight attack of rheumatism, or following it after an interval of apparent health, active carditis is suddenly announced by restlessness, increased pallor, and a curious aspect of anxiety, together with dyspnœa, delirium, and sometimes obstinate vomiting. Often there is heart-pain; and tenderness over the cardiac region is a common and important symptom. The act of respiration is distressing and is accompanied by the short expiratory grunt so characteristic of the acute chest affections of young children. Along with these symptoms there is a preference for the raised position; and some children, with great distress for breath, will lean forward in search of

relief. When these symptoms rapidly progress to a fatal end, as they often do, it is sometimes prostration, sometimes delirium, sometimes persisting vomiting that shows most conspicuously; but the main source of the symptoms, however these may arrange themselves, is manifestly cardiac failure. In no small proportion of cases wasting and sweating are the premonitory symptoms, and the history of antecedent rheumatism will often be extremely vague. The mortality is considerable. Of sixteen cases treated by the author within the last three years, four only recovered. The pericardium was adherent in all the fatal cases, and in only one was there extensive valve disease. In most, the endocardial change was limited to small granulations on the mitral valve. The pulse in these cases is small and of low tension. The body-heat is seldom much raised, and its variations are difficult to interpret. Of the physical signs of rheumatic carditis in childhood, whether active or passive, the pericardial are the more obvious and the more immediately important. Pericardial inflammation at first neither distends the pericardium nor causes audible rubbing. It is recognized, or rather it is suspected, by fallible signs such as altered rhythm, with quickened and tumultuous cardiac action, increase of cardiac dullness not appearing until the fluid is sufficient to push aside the edges of the lungs. Friction does not develop until the earliest exudation has acquired some consistency. The progress of the pericarditis is measured not by the rub, but by the daily changes in the area of cardiac dullness. The friction rub, as a guide, is deceptive in the early stages, because at first it is only by happy chance that we hit upon it, and, later, because exocardial sounds which suggest rubbing may be heard at a time when actual attrition is rendered impossible by firm adhesions. The noise of the friction is not proportionate to its importance. The slightest scratching early in the disease may be the prelude to severe or fatal carditis; on the other hand, loud and extensive rubbing sounds may become audible when the effusion has subsided and the danger is past. The cardiac tenderness which accompanies the friction rub in acute cases is a most suggestive sign; also the change in the friction with varying pressure of the stethoscope and sometimes also with altered position and with time. Pericardial distension is another physical sign of pericarditis. This arises together with the friction rub, but, like the friction sound, it is not

appreciable at the very beginning of the inflammation. These acute cases are distinguished clinically in that (1) the cardinal feature is a rapid cardiac failure which the physical signs very imperfectly explain, the signs being precisely the same as may occur with passive carditis where there is no similar failure and no threatening symptom whatever; (2) the general symptoms are mainly cerebral or, at least, nervous,—delirium, constant vomiting, sudden prostration; (3) the fatal cases very closely resemble the non-fatal in clinical respects. When death is escaped, recovery is complete and sometimes rapid. Anatomically (1) the pericardium is always adherent, often extensively and firmly adherent, the adhesions being more or less recent; (2) the endocardium, generally speaking, is but little affected, the tiny granulations upon the mitral valve, which are the characteristic appearance, being quite insufficient to render the valve incompetent; (3) the muscular substance of the heart undergoes but slight degenerative change. There is no more striking nor more important feature of heart disease, as it happens to children, than the close relation between endocarditis and pericarditis. A recent rheumatic endocarditis in the case of the adult leaves little fear of pericarditis presently supervening. With the child that fear is never absent.

In most instances of pericarditis there is a slight displacement outward of the heart's apex. According to Stärek the apex up to the fourth year should be just outside the nipple-line, from 5 to 6 in the nipple-line, and after 6 inside that line. The cardiac area of superficial dullness he found to diminish with the years, both as to its upper and its left boundary. The deep dullness at both 6 and 12 years is practically the same. The superficial dullness is lower by the width of the fourth left rib at 12 than at 6, and it has its left border on the parasternal line. This Garrod explains by the more horizontal or recumbent position of the heart in childhood, the organ becoming more erect as the child grows. In cases of acute pericarditis the variations in the area of cardiac dullness are slight. The period occupied by the three stages of effusion—advance, acme, and decline—is included within a fortnight. The time of decline is apt to be longest and the acme shortest. Where effusion is considerable there is widening of the intercostal spaces from the second rib downward, with accompanying elevation of these spaces. An appearance of raised

flatness is thus produced contrasting strongly with the natural contour of ribs and spaces as seen in the right chest. Where there is pericardial effusion the heart may be moved either forward, upward, or backward, or it may remain where it was; the chief factor determining its condition is pericardial adhesion. The author has repeatedly, in fatal cases of effusion, inserted needles just before the post-mortem examination, without being able to detect any dislocation of the heart upon opening the chest. In the more lengthened attacks the pericardial sac is observed to widen disproportionately to its heightening, and it is in such cases, when newly observed, that much difficulty may arise in distinguishing between the dilated heart and a fluid-laden pericardium. It is, in fact, not by the particular shape or extent of cardiac dullness at a given time, nor yet by any constant differentiation in character of the heart-sounds, that this differential diagnosis is safely made, but by the daily measurement of the changing area of dullness. It is very rarely that the pericardial effusion of rheumatic children becomes so extreme as to need paracentesis.

While the rheumatic heart-inflammation is affecting the pericardium the endocardium is suffering also, but endocarditis at its commencement does not impair the efficiency of the valves. No single sign, perhaps no combination of signs, indicates with certainty the very beginning of endocarditis. The earliest indications of it in children acquire significance only when associated with rheumatism. Tumultuous, quickened, and uneven heart-action; sounds changeful from day to day, especially the first sound; reduplicated sounds, especially the second, at and above the apex, but not at the base; a temporary tricuspid murmur; marked accentuation of the first sound, whether mitral or tricuspid,—these are among the commonest of such sounds; but it is not in all cases that endocarditic sounds are thus developed. Sometimes mitral reflux arises very early, without notice or warning. Endocarditis, there is reason to believe, occurs together with the joint-pains, and not at some indefinite period afterward; but the first heart-signs are obscure and ambiguous, while the joint-pains are slight and brief; and so it habitually happens that the gradual development of endocarditic signs in the first rheumatic attack concurs with the time when the child, apparently recovered, is out of medical reach. This gradual development of a mitral murmur is the source of

much misconception. The patient is dismissed heart-well. He returns presently with a second attack of rheumatism and a mitral murmur. This latter has, in fact, developed very slowly in the interval between the two attacks. It is the sequel of endocarditis, not endocarditis itself; but the physician, consulting the notes of the first admission to the hospital, takes it for new. He quotes it as proof that the first attack may fail to touch the heart and that permanent regurgitation is not always the work of time. Both statements are perhaps true, but they have fewer illustrations than at first seems. The influence of posture on murmur and the reduplication of the second sound may often be observed in these early cases. At first, upon making the patient sit up, the more vigorous systole serves altogether to abolish these morbid sounds; after a while this effect is accomplished for a short time only, the murmur becomes permanent, and posture affects it but little. Endocarditis does not at first produce regurgitation, or at least does not produce it by any effect on the mitral valve itself; yet the muscular weakening of the inflamed left ventricle impedes the inflowing blood and tends to engorgement of the pulmonary vessels; this, in its turn reflecting on the right ventricle, leads to accumulation of blood therein, which is relieved by tricuspid reflux,—safety-valve action. If this be so, it follows that in endocarditis it is not the left and inflamed side of the heart that will give the first note of soufflé; it is the right and uninflamed side. A tricuspid murmur is both the earliest symptom of inflammation and a token of relief. There is a concurrent or even a yet earlier effect of endocarditis, namely, disturbed action and rhythm of the heart. This is no other than the irritability of the heart-muscle due to the altered relation of the inflamed endocardium and the blood that visits it. Tumultuous action, variability, reduplication of the second sound, and altered tone are joint signs of this irritability. There are many varieties of first sound, all of them more or less indicative of commencing endocarditis, but prolongation of the first sound right up to the second is a precise description enough. Such words as “booming,” “rolling,” “rattling,” and many more, although satisfying their authors, hardly suggest to an individual what manner of sound he is to listen for, but presently the sound itself will strike upon his own ear and become his possession forever.

Presystolic murmur is far from common among children. It depends upon structural changes that need time. Early systolic murmur, on the other hand, a harsh commencement of the first sound converting w-h-o into t-h-r-o, is commoner with them than with their elders. This will sometimes arise early in the course of rheumatism, usually in the first attack of it, presently to disappear or to tone down into a soft-blowing systolic murmur.

For the production of presystolic murmur there is need not merely of a contracted mitral orifice, but of an hypertrophied auricle. When either of these elements is wanting, whether the narrowed passage or the extra power necessary to overcome it,—no audible pushing, so to speak,—no presystolic murmur is heard; and so it is common to meet with extreme constriction of the mitral orifice after death, where no presystolic murmur has been developed in life. It is quite usual also to find the auricle failing temporarily or permanently to perform its extra work, and, in the course of time, inasmuch as the stenosed mitral orifice is also incompetent, the presystolic murmur gets replaced by a regurgitant murmur.

The conditions necessary for the production of presystolic murmur are not often met with in children. The post-mortem experience of eleven years at the Hospital for Sick Children supplies but a single example of “button-hole” contraction of the mitral valve, and this one, a boy of 9 with cellulitis, was not known to have had rheumatism. The chief form of rheumatic mitral endocarditis met with in children at an early stage consists, as is well known, of a ring of minute granulations on the edge of the valve, but not appreciably constricting it. These effect no more after the active stage of inflammation is passed than to cause the blood to pass over a rough surface instead of a smooth one. A later stage is not in the way of narrowing, but of stiffening as regards the mitral flaps and chordæ tendineæ. Such a condition seems fitted to produce tardy closure rather than any material hindrance to the onward blood-flow. The thrill is caused by these stiffened flaps held edgewise to the regurgitant stream.

Certain circumstances are of aid in determining the prognosis; for example, age, previous attacks, and the disposition to rheumatism which these imply; nervous implication, the presence of subcutaneous nodules, the changeful or fixed character of the physical

signs, the prominence or otherwise of pain or incompetence, the degree of pallor, and the rate of wasting.

Rheumatism occurring at an unusually early period of life—say, at 4 or 5 years—is very nearly allied to carditis, and sometimes shows itself chiefly by heart-inflammation. It may be said, other things being equal, the younger the child, the greater the peril to life. In the case of a young child we may reckon that every successive attack of rheumatism, however mild, is a fresh injury to the heart. The child past 8 or 9 with acute carditis is far more safe than he would be at an earlier age. Unfavorable are cases where an acute rheumatic attack is presently repeated in respect of its pyrexia and sweating, but this second time with symptoms which are cardiac, and not articular.

Of physical signs in their bearing on prognosis it may be said that, so long as such signs are recent, referable only to the endocardium, the fear of pericarditis with the active signs of carditis is more or less according as the heart's conduct varies or does not vary from day to day. So long as the physical signs are changeful there is real danger. This is true both in regard to external and internal inflammation of the heart. The appearance of nervous symptoms in whatever degree at an early stage of endocarditis, vomiting, severe headache, weariness, passing delirium, uneasy sleep with night-terrors, justifies anxiety however favorable the child's progress may be in other respects. Finally, the author's experience fully accords with that of Cheadle's as to the evil import of subcutaneous nodules.

In discussing the treatment, the author believes that abstraction of blood by leeching is the most potent means of relief for those sudden attacks of dyspnœa which, in the case of children, are apt to be so rapidly fatal. Plasters do neither good nor harm. Digitalis is worse than useless in the acute cases which we are now considering. The author has tried the application of ice over the pericardium without being much impressed as to its value.

Etiology of Chronic Valvular Disease.—Ashton ⁹_{June 30, '54} has observed 1024 cases of chronic valvular disease with especial reference to the causative influence and the relative distribution of the lesions. A clear history of rheumatism or rheumatic pains was obtained in 383 cases, or 37.4 per cent. of the whole. An antecedent history of the infectious fevers was the only cause that could

be adduced in 100 cases, or nearly 10 per cent. of the total. The history of syphilis, undoubted or obscure, was obtained in 91 cases, or nearly 9 per cent., and a history of alcoholism in 184 cases, or nearly 18 per cent. of the total. In all of the cases in which a history of syphilis or of alcoholism was elicited diffused arterial sclerosis was present. In 324 cases, or over 31 per cent. of the whole, diseases of the vessels existed. An interesting fact is the large number of cases for which no cause could be assigned,—218, or over 21 per cent. The author concludes that rheumatism may produce endocarditis, even when the disease causes no evident disturbance of the functions of the joints. A table showing the important facts about the cases observed is given on next page.

The Influence of Pressure and Posture on Cardiac Signs.—Ringer and Phear⁶_{Feb. 10, '94} bring out some practical points concerning the diagnosis of cardiac murmurs. First, the modification of murmurs by pressure. If, when listening to a murmur, pressure be made with the stethoscope, the character of the murmur is altered. The murmur is weakened and its pitch raised. The change is noticed better in children with elastic chest-walls than in adults, and better in fat than in thin persons. It is laid down in text-books, and generally accepted, that the intensity of a pulmonary hæmic murmur is increased by pressure. This is undoubtedly true in some instances, and in many children a murmur can be actually produced, where none was audible before, by properly-applied pressure. “We find, however, that in by far the larger number of hæmic murmurs pressure (as would be expected) has the same effect as in other murmurs,—namely, the intensity of the murmur is not increased, but diminished, and the pitch of the murmur is raised.” Frequently, the authors maintain, the pitch of a murmur will vary at different points of the chest without any variation in the degree of pressure; so the conclusion cannot justly be made that two murmurs are distinct because they contrast with one another in pitch and timbre. Of much greater value is the consideration of the intensity of the murmur at different points. If it is heard clearly at the apex and also clearly at the base, and if there is an intermediate point between them at which it is not heard at all, or, at any rate, less loudly than at either apex or base, then it may be safely concluded that one has to deal with two separate murmurs, and not with a single murmur conducted from one

point to another. But in order to determine whether it be one or two murmurs it is important that the pressure of the stethoscope should be the same in each place.

Secondly, the effect on murmurs of slight change in posture. A very slight inclination to one side or the other may cause the point of maximum intensity of a murmur to shift, this occurring more readily on leaning toward the left than toward the right side, and being much more noticeable in basic than in apical murmurs. Thus, in a man who had a well-marked double basic murmur of aortic origin, when he was lying on his back the diastolic murmur was heard loudest close to the sternum in the second left interspace, the systolic murmur being most plainly audible in the second right interspace close to the sternum. After turning over toward

Lesion.	SEX.		AGE.												OCCU- PATION		ANTECEDENT HISTORY.					Total.	Per Cent.					
	Male.	Female.	1-10		11-20		21-30		31-40		41-50		51-60		61-70		71-80		Light.	Laborious.	Rheuma- tism.			Infectious Fever.	Syphilis.	Alcohol- ism.	Negative.	Sclerosis, or Atheroma of Blood-vessels.
			M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.										
Mitral incompetency	205	262	14	12	43	69	118	54	41	29	37	35	31	40	11	23	..	..	223	334	213	54	47	93	125	169	557	54,400
Aortic stenosis	101	35	3	1	5	1	9	4	15	6	27	11	32	10	10	2	..	..	43	93	42	15	17	34	23	59	136	13,282
Aortic stenosis and incompetency, with mitral incompetency	65	28	7	3	4	8	10	5	6	3	15	5	16	4	6	..	1	..	34	59	37	8	15	18	11	32	93	9,068
Aortic incompetency	32	15	2	3	1	1	4	2	5	1	8	4	9	3	3	1	..	..	19	28	18	4	3	10	9	13	47	4,585
Aortic stenosis and mitral incom- petency	31	14	1	..	3	1	4	1	3	2	7	3	9	4	4	2	..	1	15	30	15	3	5	13	6	17	45	4,385
Aortic stenosis and aortic incom- petency	27	11	1	..	2	1	4	..	5	2	6	2	8	6	1	..	..	..	9	29	17	4	3	5	7	15	38	3,717
Aortic incompetency and mitral in- competency	26	7	2	1	2	2	6	1	2	..	4	..	7	3	3	..	..	..	9	24	16	4	0	5	6	9	33	3,222
Mitral stenosis	15	17	3	2	5	8	2	4	1	..	4	2	..	1	..	..	..	..	20	12	10	2	0	3	16	4	32	3,143
Mitral stenosis and mitral incom- petency	13	19	4	7	4	3	2	..	..	3	1	4	1	2	1	..	..	..	19	13	13	4	1	2	9	6	32	3,115
Tricuspid incompetency	7	4	4	3	..	1	..	..	2	..	1	..	..	..	..	..	..	..	9	2	2	2	0	1	6	0	11	1,071
	612	412	41	32	69	95	150	71	80	46	110	66	113	73	39	28	1	1	400	624	383	100	91	134	218	324	1024	100,000

the left through an angle of forty-five degrees the points of maximum intensity of both murmurs were found to have shifted three-fourths of an inch to the left. The apex-beat had shifted nearly an inch to the left of its former position. After turning from the back toward the right through the same angle it was found that the point of maximum intensity of the diastolic murmur had come to lie on the right of the sternum; the intensity of the systolic murmur to the right of the sternum was notably increased, but its position had hardly altered; the apex-beat had shifted to the right. That these phenomena are due to an actual change in the position of the heart is indicated by the apex-beat, which will be observed to move one-half inch or more out of its previous position,—much more readily to the left than to the right. In many cases, if the patient is turned toward the left, there will be some delay in the shifting of the heart, the point of maximum intensity of the murmur remaining for one or two minutes in the same position as when the patient was lying on his back. There is sometimes a similar delay in the return of the heart after the patient had turned from the left so as to lie again on his back. The intensity of the second sound is modified by posture in a similar manner, so that on leaning to the left the second sound, previously louder on the right side than on the left, becomes louder on the left than on the right; or the point of maximum intensity, if on the left side from the beginning, may shift one-half inch or more farther to the left; or the second sound, which was previously weak on both sides, may become loud on the left and almost inaudible on the right. The slightest inclination to the left may be sufficiently great to intensify the second sound as heard on this side.

Double Souffle of Duroziez Modified by Pressure.—Lan-
nois ²¹¹_{June 17, '94} has noticed that, by firm pressure upon the femoral artery at a point just beyond the stethoscope, the double souffle of Duroziez, which is one of the signs of aortic regurgitation, can be much more distinctly heard than when pressure is removed. In the same way pressure exerted on the distal side of the sphygmograph in aortic regurgitation will bring out more strikingly the characteristic tracing of the disease. It should, however, be borne in mind that the double souffle of Duroziez may be heard in convalescence from typhoid fever, in chlorosis, in lead poisoning, and in some other conditions without any lesion of the aortic valves.

Distant Propagation of Cardiac Murmurs.—Oddo ⁴⁶_{Nov. 16, '93} speaks of the propagation of loud cardiac murmurs to distant parts of the body. Cases have been reported by Federici, Vanni, Meynet, and Racle, as well as the author. These murmurs of distant propagation are said to be always of low pitch and of vibrating quality, and systolic in time; that is, centrifugal. To take one example (Federici): A young girl with aortic stenosis had a rough systolic souffle all over the cardiac region, and with this a thrill. The murmur was propagated to the top of the head, the chin, the cheeks, the forehead, the mastoid prominences, along the neck and the vertebral column as far as the end of the sacrum, on the back of the upper arm, both back and front of the forearm, but more distinctly at the elbow and the top of the shoulder, and, finally, if the patient's finger were put in the ear of the observer, the arm being in a relaxed state, a faint murmur could be thus perceived. The sound could also be heard by listening attentively at the crest of the ilium. In Oddo's case the diagnosis was mitral regurgitation, and the murmur could be heard not only in the upper part of the body, but in the thigh and along the tibia to its lower third. In regard to the reason of such extraordinary propagation of murmurs it has been suggested that they were carried by the bony structures, but that this is not the only way is shown by the fact that an Esmarch bandage applied to the arm will cut off a murmur previously heard at a more distant point. An objection to this experiment having been made that the rubber band may have acted so as to destroy the sound, it was shown by Vanni on a cadaver that the bone alone, denuded of flesh, still proved an admirable conductor of sound, even when firmly bound up. It is probable that the murmurs are transmitted by the blood-vessels and also by the bony parts.

A Measure of the Heart's Functional Power.—Jaquet, of Basle, ²¹⁴_{Apr. 15, '94} has made an effort to measure the functional capacity or resistance-power of the heart by observing the effect upon its action produced by muscular exertion. The apparatus employed, which he has christened *ergostat*, makes about the same demand upon the muscles as is called for in climbing stairs, with the difference, however, that the patient remains constantly under the convenient observation of the physician, and that the number of foot-pounds can be increased or diminished at pleasure. His hope is

that in this way one may arrive at what he calls a dynamic diagnosis, and obtain a timely warning of the danger of cardiac overstrain in individuals whose hearts present no objective signs of disease when investigated by the ordinary methods. In particular, three things may be thus determined: (1) whether an apparently healthy heart has a normal amount of endurance; (2) whether a heart which is subject to nervous palpitation is actually weak; or (3) whether under the influence of muscular effort it evinces satisfactory energy.

Diagnosis Between Chronic Heart Disease and Chronic Nephritis.—Tyson,¹⁹ Sept. 29, '83 in speaking of the differential diagnosis between heart and kidney diseases in their later stages, gives the following sketch of renal and cardiac cases when uncomplicated:—

1. Chronic parenchymatous nephritis: Urine scanty and high-colored; high specific gravity; highly albuminous; numerous granular, dark-granular, or fatty casts; much dropsy; no mitral systolic murmur; as a rule, no hypertrophy of left ventricle, although this may be present at times; no enlargement of liver; no signs or symptoms of arterio-capillary fibrosis; no retinitis albuminurica; seldom a history of rheumatism, but more frequently of infectious disease; uræmia seldom; partial response to treatment.

2. Chronic interstitial nephritis, last stages: Urine, though scanty, is still light-hued, of low specific gravity, moderately or slightly albuminous; few casts, and these hyaline or slightly granular; often no casts; little dropsy as a rule, though when the heart fails dropsy may be marked; no mitral murmur; always marked hypertrophy of left ventricle, except in persons feeble and cachectic at the outset; no enlargement of the liver; symptoms and signs of arterio-capillary fibrosis should be present; retinitis albuminurica may be present; history of gout, lead poisoning, or free eating and drinking, but no history of rheumatism or infectious disease; uræmia frequent; doubtful response to treatment.

3. Mitral disease: Urine scanty and high-colored; high specific gravity; moderately or slightly albuminous; rarely highly albuminous; few casts, hyaline or slightly granular; much dropsy; effusion into serous sacs; mitral murmur; moderate hypertrophy of left ventricle; hypertrophy of right ventricle; enlarged and tender liver; no arterio-capillary fibrosis; no retinitis albuminurica; seldom a history of acute alcoholism or free eating and

drinking; probable history of rheumatism or infectious disease; no uræmia; generally a prompt response to treatment.

With complicated cases the difficulty of diagnosis is greatly increased, and the decision must be one of probabilities. A fact of great value in favor of the primary and advanced kidney disease is the failure of heart-tonics like digitalis to produce diuresis, even though the rate of the pulse is decidedly reduced and its tension raised.

The practical bearing of these distinctions lies not so much in the direction of therapeutics as in that of prognosis, for the treatment of these conditions is essentially the same. In the matter of prognosis, however, a correct distinction is of extreme importance, for in pure mitral disease, not too far advanced, the most favorable prognosis may be given; while in the stage of renal disease under consideration, and in the combined form with actual structural change in both heart and kidney, the prognosis is very unfavorable.

Prognosis of Valvular Disease.—Hutchinson ⁸⁰⁶_{Oct., '93} reports a case illustrating this subject in a railway-inspector, aged 50, in good health, who came under observation for chronic eczema. The patient had never had rheumatism. His heart disease had been recognized from youth, and at the age of 17 he had been taken to Sir William Gull for advice. The patient said that he had often sat in the railway-carriage panting for twenty minutes before he could recover his breath, after having run to catch a train. For two years before he came to Hutchinson he had been quite free from attacks of angina, which had formerly caused him severe suffering. His immunity coincided with the appearance of his eczema.

A still more striking case was mentioned by the late Sir Andrew Clark. ⁶_{Dec. 2, '93} A house-governor of the London Hospital was about to be married and sought life-insurance, but was informed that he had heart disease and might, perhaps, live six months. The engagement of marriage was broken off. The patient resigned his position as house-governor, and was retired upon full pay, which he continued to draw for at least fifty years. Sir Andrew thought that he died at the age of 92.

Paradoxical Effect of Some Double Lesions; Prognosis and Treatment.—Baccelli, ⁶⁹_{Jan. 11, '94} in a clinical lecture, remarks that in cer-

tain cases a double valvular lesion is less unfavorable than a single one. For this it is necessary that the two valves shall be similarly affected, both obstructed or both incompetent. In illustration, he showed a man of 45, somewhat alcoholic, who had suffered, five years previously, from an attack of subacute articular rheumatism, but whose first cardiac symptoms (chiefly dyspnoea) had lasted only one year. The heart was greatly enlarged, and there was evidence of an aortic as well as of a mitral insufficiency; yet the patient was in a comparatively comfortable condition, and the pulse did not betray, either to the finger or to the sphygmograph, the ordinary characters of aortic regurgitation.

The second patient was a man of 51, of very powerful frame, who had never suffered from rheumatism or syphilis, but had been dissipated in more ways than one. The heart was enlarged five centimetres to the right of the sternum, and the absolute cardiac dullness extended nine centimetres. The diagnosis was a double, mitral and aortic, stenosis. The first symptom noticed by the patient had been faintness, with nausea, occurring ten months previously; but he had no palpitation even upon exertion, slept well upon either side, and had neither cough nor bronchial catarrh.

In the prognosis of valvular lesions the amount of compensation present is a most important factor, and yet it is difficult to conjecture when this compensation may be ruptured. Great stress should be laid upon the proper regulation of the patient's life, both as regards physical exertion and excesses, and also (what is sometimes forgotten) mental excitement of every kind. The anatomical lesion alone does not constitute the whole clinical picture. Cases are almost always complicated by other conditions which we may not be able to make out. This is what Graves had in mind when he said that even functional disturbances of the heart may be fatal.

With regard to drugs, Bacelli considers digitalis by far the best heart-tonic, and next to it caffeine; which latter, however, although it strengthens the systole, renders the heart's action more rapid, while digitalis slows it. Third comes strophanthus, which is not precisely like either of the others, and is only to be employed when the characteristic effects of digitalis and caffeine are not desired, or when they must be suspended because they act too powerfully.

The worst damage to the heart's action is done by the development of two opposite lesions in a single ventricle; for example, a stenosis of the aorta and an incompetence of the mitral valve.

A New Sign Bearing on Prognosis.—Huchard ²¹²_{June 12, '94} describes a new sign which he considers as of very serious import in heart disease. It consists in a considerable prolongation of the diastolic pause of the heart at the same time that the number of cardiac contractions is about normal,—that is, seventy to ninety a minute. The first and second sounds of the heart are very near together, and may have, especially the first sound, a brusque character with a precordial shock that suggests vigor, while yet a fatal termination is at hand; but, in these cases, while the sounds of the heart are close together, they are separated from the sounds of the next cardiac cycle by a pause of abnormal length. This rhythm is seen in almost all comatose conditions, in cerebral hæmorrhage, and especially in heart disease secondary to arterial changes. In case of aortic regurgitation due to disease of the aorta this prolongation of the diastole—brady-diastole—is not of great importance so long as the myocardium is not much degenerated; but, if there is an interstitial myocarditis, the sclerotic tissue loses its elasticity and becomes more and more dilated. By noticing this sign we may foresee, and often anticipate in our treatment, the progressive dilatation of the cardiac cavities. It indicates, further, that moderation should be used in prescribing digitalis. The two chief therapeutic indications are, first, to diminish, by prompt bleeding, the burden put upon the ventricles, and, second, to stimulate the weakened myocardium by means of large doses of strychnine or of caffeine.

Latent Endocarditis.—Galliard ³¹_{June 30, '94} reports a case of latent endocarditis in a soldier who applied for relief on account of secondary syphilis. He had no subjective cardiac symptoms, although at the time upon a fatiguing march; but, on physical examination, a loud systolic souffle was detected, which was propagated toward the axilla. The case illustrates how important the integrity of the myocardium is in affections of the heart.

Mitral Stenosis.—James Barr, of Liverpool, ¹⁸⁷_{Jan., '94} has made an important contribution to our knowledge of mitral stenosis, the views which he sets forth being enunciated as the result of personal observation. In the etiology of mitral stenosis rheumatism holds

the first place, but with the disease there is a mechanical factor determining this particular lesion; while the whole endocardium suffers from the inflammation, the permanent injury is located at the valves, because of their impact against one another; hence the importance of avoiding high intra-cardial pressure and excessive cardiac action in rheumatic cases. Among the earliest signs of endocarditis is a dull first sound and a delayed radial pulse, so that the first sound can be heard an appreciable time before the latter is felt. The pulse is slow, full, moderately strong, and the blood-pressure is well sustained. By careful attention to these signs endocarditis can usually be diagnosticated some days before any murmur is heard, affording us a better opportunity to avert serious valvular injury. When the valve has been once damaged there is a marked tendency to maintain and develop the mischief, even under the ordinary action of the heart, but this is especially aggravated by violent collision of the cusps during palpitation or during high intra-cardiac pressure from any cause. The rheumatism may have its only gross expression in the establishment of mitral stenosis, which is especially apt to happen in children. While not denying the occasional congenital origin of the disease, Barr thinks this must be extremely rare, as the affection is very seldom detected under 5 years of age.

Mitral stenosis is not uncommonly associated with or a sequel of chorea. Syphilis must be a very rare cause. The lesion is not uncommon in chronic Bright's disease, and here mechanical strain on the valve plays a very important part in its causation. In a certain number of cases mitral stenosis is found without any rheumatic or other history which would readily account for its existence. The author believes that it is quite capable of arising from long-continued mechanical causes, such as the high intra-cardiac pressure which exists in anæmia. In this disease there is increased peripheral resistance with high blood-pressure. This leads to cardiac hypertrophy, with increased strain on the mitral segments and mechanical injury to their free margins; while the heart, like the rest of the body, is badly nourished. Frequent emotional excitement and palpitation from any cause give rise to similar results. Mitral stenosis is more common in females than in males, because rheumatism and chorea occur more frequently in girls than in boys, and anæmia and all emotional

disturbances affect the female sex predominantly. The disease is, however, much more common among both sexes than is usually recognized. Under judicious treatment it is very slow in its progress and is quite compatible with a fairly-long existence. If associated with tricuspid stenosis the latter may have a conservative action, saving the heart and lungs from many strains to which they would be subjected if the mitral lesion existed alone. (See Bacelli, p. B-23.)

In making a diagnosis we need to know not merely that there is some obstruction to the flow of blood from the left auricle to the left ventricle, but also its nature, the size of the orifice, and the effect on the general circulation. As the characteristic murmur is absent in a large number of cases, many physicians fail to recognize the disease even when fully developed. The murmur is heard over the mitral area and may have the different varieties named by Bristowe,—early diastolic, mid-diastolic, late diastolic, and entire diastolic. The late diastolic, also called the presystolic and the auricular systolic, is developed at the time of the contraction of the left auricle, the appendix of which is only very rarely so thin and dilated as to be incapable of any forcible contraction. The early diastolic may be purely mitral in origin, but the author believes that it is often confounded with a short, soft-blowing diastolic murmur due to a slight regurgitation through the pulmonic valve before that valve completely closes, owing to the high pulmonic tension. The occurrence of the early diastolic and mid-diastolic mitral murmurs depends on high blood-pressure, a narrow orifice, and the aspirating force of the dilating left ventricle. The size of the orifice and the nature of the valve-segments will greatly influence the character of the murmur at whatever part of the diastolic period it occurs. At a very early stage of mitral stenosis, when the further progress of the disease may be very largely modified, if not arrested, the characteristic murmur is usually absent or there may be only a mitral systolic murmur. It may also be absent in the very late stage, when much can be done for the comfort of the patient, and when it is most important to distinguish between mitral stenosis and mitral incompetence. One sign to which the author attaches considerable importance is an extension of the cardiac dullness in the direction of the left auricle. In health there should be no cardiac dullness outside of a line drawn from

the centre of the supra-sternal notch to the nipple or to that spot on the fourth left costal cartilage where the nipple ought to be. This "supra-sternal mammillary line" should mark the left outer border of the heart. Dullness outside of it, in the direction of the outer part of the clavicle, indicates enlargement of the left auricle. In order to detect this change percussion must be very delicate, and the author believes that the employment of an ivory pleximeter is better than to use the finger.

The pulmonic second sound is accentuated in mitral stenosis, and is often best heard lower down than the second intercostal cartilage; that is, over the conus arteriosus, or the right ventricle. Doubling of the second sound of the heart is a very common phenomenon in mitral stenosis, but it is not a pathognomonic sign. The second element of the double sound is invariably pulmonic, and the reduplication is due to a relatively-large quantity of blood in the right ventricle, with heightened tension in the pulmonary artery. The right ventricular systole being protracted, the closure of the pulmonic valve occurs appreciably after that of the aortic valve. It may frequently be heard, in normal hearts, at the end of inspiration or commencement of expiration. Where the right ventricle is failing and free tricuspid regurgitation is taking place, or the ventricle is not emptying itself during systole, there may be no doubling. Its absence, therefore, may be of more grave significance than its presence, and we should not view it as a certain sign of mitral stenosis nor fail to recognize that lesion when the sign is wanting. A doubling of the first sound is quite a common event in mitral stenosis,—a fact which is not put down in our text-books. The explanation of this reduplication of the first sound is that we have a comparatively large right ventricle and a small left ventricle. The former contains more blood, and therefore tries to discharge more at each systole; but, of course, in a given time, no more blood can pass through the right ventricle than leaves the left; therefore the extra effort of the right ventricle is used up in maintaining high pulmonic tension, which, with the aid of the left auricle, drives the blood forcibly through the narrowed mitral orifice during diastole. But very high pulmonic pressure and overloading of the right ventricle often tend to prolong the contraction of the right ventricle beyond the short, sharp, and effective systole of the left, and thus we get asyn-

chronism in the closure of the two sets of arterial valves, with consequent doubling of the second sound. The large distended right ventricle never completely empties itself during systole, and frequently the discharge is so slight that it is again quickly distended, and this initiates a contraction which is propagated to the left ventricle before that ventricle is quite full, giving rise to a systole of the latter when it is comparatively empty and can emit scarcely blood enough to raise the aortic valve. This goes on till the right ventricle has disposed of its superfluous share of blood, and then the rhythm may become quite regular, until the right ventricle is again overdistended. This peculiar action of the heart is very pronounced in mitral stenosis, but it is by no means limited to that disease. It may arise where the innervation and balance of blood-pressure in the two sides of the heart is disturbed from any cause,—as emphysema, fatty degeneration of the heart, or atheroma of the coronary arteries. The first sound of the heart in mitral stenosis is usually loud, clear, sharp, abrupt, and banging or thumping. It may be described as resembling an accentuated pulmonic second sound, only nearly twice as long. The pulse is very variable. When the compensation of the right ventricle is fairly well maintained the pulse is infrequent, slow, small, firm, and fairly regular. When the mitral orifice is very much contracted it becomes very small, infrequent, weak, and irregular, both in force and rhythm, with numerous interpolated beats. When the right ventricle is much dilated, failing in power, with consequent free regurgitation through the tricuspid orifice, the pulse becomes frequent, quick, small, weak, and very irregular in force and rhythm. The lungs are in the condition known as brown induration. Very delicate percussion will detect little areas of dullness arising from congestion of lobular tracts of the pulmonic vessels. The dullness is never absolute and the areas themselves are apt to vary from day to day. These dull areas occur especially when the patient has been lying on his back. The liver and the whole venous system are engorged. The hepatic dullness may extend below the level of the navel, but the spleen is not usually much enlarged. The veins of the neck frequently pulsate visibly, especially when the patient is recumbent, which is due to regurgitation through the tricuspid orifice; and, when there is also tricuspid stenosis, the pulsation

becomes double, corresponding to the systole of the auricle and the systole of the ventricle. In combined mitral and tricuspid stenosis the tension in the veins of the neck is also much higher than in mitral stenosis alone. Dropsy does not occur until there is failure of the right ventricle, and, unlike that in cases of mitral regurgitation, it frequently begins with an ascites. Embolism is not an infrequent sequence in cases of mitral stenosis, usually arising from thrombi in the left auricle.

There are few chronic diseases, in the opinion of the author, so amenable to treatment and so compatible with a comparatively long life of comfort if judiciously handled. In the early stages we should lessen the high arterial tension, which is usually present, so as to obviate all strain on the mitral valve. This is best accomplished by the administration of salines and alkalies and by enjoining moderate exercise and a light diet with little fluid. The patient should be guarded against the development of acute attacks of rheumatism. A warm, dry climate is the best, at not too great an elevation above the sea. The life should be at a low level in every other respect also, free from all mental worry and care. Marriage cannot be recommended, especially to a female. Nevertheless, very many non-emotional women suffering from mitral stenosis bear large families. Short of actual fatigue, a fair amount of exercise, even to the extent of climbing hills, will prove highly beneficial by improving the circulation, increasing tissue metamorphosis, and improving the general nutrition. The skeletal muscles normally contain about one-fourth of the whole blood of the body; yet, if they be not used, comparatively little blood passes through them, and the general arterial tension is consequently increased. The food should be light and nutritious, with a fair proportion of vegetables, and no meal should be so heavy as unduly to distend the stomach. Neither quantity nor quality should exceed the demands of a healthy nutrition. Patients should drink as little fluid as possible, never more than two pints a day; and, if the tissues are at all flabby, the author frequently reduces the allowance to one pint daily. The regular use of all alcoholic drinks and of tobacco should be strictly prohibited.

In this early stage of the disease drugs are unnecessary, unless some complication arises, or unless there is some failure in compensation precipitated by excessive strain or other cause. If there is

anæmia iron should be prescribed combined with a laxative, preferably with one which acts on the liver. The disease has a progressive tendency; and, when there is any indication of failure of compensation of the right side of the heart, rest in bed must be at once adopted. If a long stay in bed be deemed advisable, massage must be substituted for the loss of active muscular exercise. Pulmonary engorgement is best obviated by reducing the amount of fluid in the circulation. The lungs may become so engorged that nature seeks relief by profuse hæmoptysis, and in these cases this is the most direct and best method of blood-letting. Relief can also be obtained by brisk catharsis with salines, and by sweet spirits of nitre or small doses of nitroglycerin. Barr also believes that aspiration of blood from the liver would be a very rational and effective mode of relieving the distended right heart. Blood-letting from the arm tends merely to complete the emptying of an already depleted arterial system, and so hasten the not-far-distant end. In an urgent case, therefore, the author would have no hesitation in aspirating the right ventricle and right auricle, or, in less urgent cases, freely aspirating the liver or opening the hæmorrhoidal veins. The right ventricle should be further relieved by brisk cholagogue cathartics. The action of the heart should be aroused by warmth, sinapisms to the præcordia, ammonia to the nostrils, and the internal use of atropine, ammonia, ether, or alcohol. These drugs should be given with as little fluid as possible. When the patient is cold and pulseless, ether and atropine may be injected hypodermatically. As a cardiac tonic in mitral stenosis, strophanthus is the author's favorite. It acts to lessen the size and increase the force of the right ventricle, but it is usually better to combine with it some agent to distribute more evenly the work of the heart, such as nitroglycerin, sweet spirits of nitre, or alcohol. Atropine is a respiratory stimulant and a cardiac tonic, and it also lessens peripheral resistance. In some cases small doses of it with nitroglycerin work admirably. It must be remembered, however, that, with advancing recovery and diminution of blood in the veins, it is not prudent to dilate the systemic arterioles greatly. Too free an escape of blood from the capillaries into the veins would tend to keep the arterial pressure at a low ebb. About $\frac{1}{200}$ grain (0.00032 gramme) of atropine, combined with a similar quantity of nitroglycerin, three or four times a day, is usually sufficient.

To this may be occasionally added 5-minim (0.32 gramme) doses of digitalis or strophanthus. Ammonia, caffeine, and nux vomica often prove good substitutes. As the case advances toward recovery a mixture of citrate of quinine and iron, with digitalis and strychnia, given for short, intermittent periods, does good service.

Mitral Stenosis without a Murmur.—At a meeting of the Society of the Physicians of St. Petersburg, Masing ²¹_{Dec. 16, '93} reported, with autopsy, the case of a man, 52 years old, who for seven years had suffered from increasing dyspnœa, when, in 1890, he was taken with hæmoptysis, with subsequent infarctions, first in the right, then in the left lung. No tubercle bacilli were found in the sputum. The case was followed during the succeeding years. In August, 1893, four months before death, the heart's action was disordered and stormy, but its tones were clear, without a murmur. At no time could the reporter or Amburger, who was called in consultation, detect any murmur. The autopsy, on November 2, 1893, showed a well-marked stenosis of the mitral valve, which admitted only a good-sized lead-pencil. Moritz suggested that perhaps the smoothness of the stenotic valve accounted for the absence of a murmur.

The "Snapping" Character of the First Sound in Mitral Stenosis Not Due to the Tricuspid Valve.—Finley, ²⁸²_{Apr., '94} in reporting the case of a woman who died, at the age of 33 years, from mitral and tricuspid stenosis, brings out a point of interest in connection with the first sound of the heart in mitral stenosis. In this particular patient the first sound was abrupt, greatly accentuated, and snapping in character. Fenwick and Overend have ascribed this well-known peculiarity of the first sound to the closure of the tricuspid valve in the hypertrophied right ventricle, but in the present case the tricuspid valves were too rigid to produce any such sound.

Has Mitral Stenosis any Relation to Arrested Pulmonary Tuberculosis?—Martin-Durr ⁷_{No. 6, '94} reports the autopsy of a woman who died, at the age of 45 years, in the Charité Hospital, of uncomplicated mitral stenosis. Upon autopsy, besides the mitral obstruction, there was also found the evidence, in both lungs, of a tuberculosis long since healed. Inasmuch as this makes the fourteenth case of mitral stenosis, combined with arrested pulmonary tuberculosis, that has come to autopsy in the same service, the

author raises the question whether there is not some essential relation between the two diseases.

A Diastolic Murmur in Mitral Stenosis Ascribed to Pulmonary Regurgitation.—Pawinsky ⁸⁴_{June 17, '94} reports four cases of mitral stenosis in which he observed a murmur ascribed by him to relative insufficiency of the pulmonary valves. (See Barr, p. B-27.) The corresponding murmur was a long-drawn-out, blowing sound, which sometimes occupied the whole diastole, but sometimes began after the second sound, and was heard on the left edge of the sternum in the third or fourth intercostal space. It was not heard over the aorta at all, nor beyond the right edge of the sternum. Schwalbe ⁶⁹_{Aug. 19, '94} is inclined to doubt the correctness of Pawinsky's explanation. He asks why, if Pawinsky be correct, the mitral stenosis does not in every case cause the development of this murmur.

Mitral and Aortic Regurgitation Independent of Valvular Deformity.—Dombrowski, ⁹⁹_{Mar. 22, '94} in commenting on the usual explanation given for inorganic insufficiency of the mitral valve,—namely, that it results from distension of the orifice, so that the flaps are unable completely to close it,—states that such dilatation is by no means invariably found; and, besides, the orifice is surrounded by a tendinous ring the resistance of which is not easy to overcome, as he has proved by several experiments. Moreover, Wulf has shown that the surface of the flaps greatly exceeds the size of the orifice; and the transitory character of the murmur, which disappears and then, perhaps, after a certain time, re-appears, does not accord with the supposed distension of the orifice. The cause of the insufficiency must, therefore, be sought in the separation of the insertions of the papillary muscles, occasioned by the dilatation of the ventricle. He would prefer the term “functional” to that of “relative” insufficiency. In rare instances the aortic valve may become insufficient, although free from any lesion. This insufficiency, in contrast to that of the mitral valves, is always relative and depends on a dilatation of the aorta. It is a terminal symptom,—a precursor of death. In the differentiation of the condition from a true aortic lesion, stress should be laid on the age of the patient (it never occurs under 50 years of age), the signs of general atheromatous changes, its slow and insidious development, with probably a long history of symptoms of

increased blood-pressure, such as oppression, palpitation, and vertigo, to which should be added the signs characteristic of dilatation of the aorta,—pulsation in the neck, dullness under the manubrium, and a metallic quality of the second cardiac sound.

Cardiac Asthenia.—Da Costa ⁵_{Apr., '94} discusses cardiac asthenia, or heart-exhaustion, a condition in which there is for a long period habitual feeble action of the heart, and in which this constitutes the essential and only appreciable disorder. This heart-feebleness or heart-exhaustion comes from two causes,—either nervous failure or a weakness of the heart-muscle. In some instances it is due to a combination of both. When due to nervous failure it generally follows the strain of worry or overwork. There may be a sudden cardiac collapse; the patient is obliged to stay in bed, and if he try to sit up or raise the head there may be syncope or a close approach to it. The heart's action is feeble, the pulse very small and compressible and generally increased in frequency. There is a sense of uneasiness in the cardiac region, but very rarely actual pain. The extremities, nose, and the ears are cold; the general temperature is somewhat below the normal. The breathing is conspicuously unaltered, although there may be a sense of oppression. Insomnia may be complained of. Apprehension and low spirits are very common. Improvement is slow. The course of the disease is as markedly chronic as the onset is markedly rapid. The heart's action is mostly accelerated, but not irregular, although in some cases there is irregularity. It is very variable, always rises rapidly after meals, and is influenced by the slightest exertion. The physical signs of the heart-disorder are very significant: there is no increased area of dullness; the impulse is feeble, difficult to find, not diffuse. The first sound is short, lacking in volume, and it may be obscure or short and valvular; the second sound is accentuated. Excluding the anæmic murmurs, which are very infrequent, since anæmia does not play an important part in the affection, we may rarely have functional apex-murmurs of dynamic origin, and these murmurs may be brought out by suddenly closing the hand tightly. A sensitiveness to touch in the cardiac region is at times noticed. One case of the author's became diabetic in the second year of his trouble. The disease is one of all ages except childhood and very old age. The great majority of the author's patients have been men, a number of them physicians.

The diagnosis is not, as a rule, difficult. The evident nature of the causes that have given rise to the breakdown, its generally sudden onset, the unembarrassed breathing, and the feebleness of the pulse and of the cardiac impulse are full of significance. The physical signs, as well as the state of the respiration and the clinical history, separate the weak, asthenic heart from the weak heart of organic type, such as the typical ones of this group,—fatty degeneration and cardiac dilatation. From the irritable heart it is distinguished by the history, by the fact that in this disease the patient has had a heart-strain or a gastric or an intestinal affection; that he is able to be about; that the heart's action is generally much more rapid, much more influenced by change of posture; that the impulse is sharp, jerky, diffuse; the pulse quick, small, not so even; the second cardiac sound sharp and distinct. The tobacco-heart resembles the asthenic heart much more closely. The most difficult point in diagnosis is to distinguish the weak heart of nervous origin from the cases of inherent muscular weakness, in which, however, no obvious disease of the muscle exists. This muscular form is very much rarer than the nervous and very much more persistent. The symptoms are the same as regards the feeble circulation, but there is this decided difference: shortness of breath, especially on exertion, is very common; and œdema of the ankles and insteps, passing though it be, is often met with. The physical signs in the heart do not differ except that the first sound has less tone, is indefinite, and not so valvular. Reduplication of either sound of the heart is much more usual, and so are functional, dynamic apex-murmurs. The heart-muscle in these long-standing cases is probably flabby, but the author doubts if it present marked organic change. It is, however, certain that dilatation of the heart and insufficiency of the mitral valve may finally come on and the affection thus become organic. In the asthenic nervous heart the prognosis is very good. Under treatment and in time all cases recover. There is danger from so-called heart-failure, but the author has never met with an instance. For the cases of asthenic nervous heart rest in bed is at first essential, and when they are able to sit up nothing does the patients so much good as the graduated shower-bath. Massage, too, may be employed, but many cannot at first bear it and it comes in better at a later stage of the treatment. It is then, too, that Swedish movements may be recom-

mended and carefully-adjusted exercises, such as walking, gentle horseback exercise, or light gymnastics. The food should always be as nutritious as possible, taken as frequently and as freely as the digestion will readily tolerate. Stimulants often have to be resorted to. It is astonishing in what quantities they are borne and temporarily even required by the nervous heart, though, for fear of forming a habit, we have to withdraw them as soon as the circulation strengthens.

Among drugs strychnine stands pre-eminent. The dose need rarely exceed $\frac{1}{30}$ grain (0.002 gramme) three times a day, but it must be continuous. Arsenic in the nervous asthenic heart comes next to strychnine. Its action cannot be explained by its removing anæmia, for it proves to be valuable where the blood-count is normal. Of so-called heart-tonics digitalis is the best, but it is not the certain remedy we might suppose. It is, on the whole, best adapted to the cases with muscle-weakness. Where we give it in large doses the patient should be kept in bed. In some instances it does not suit at all. Strophanthus is generally said to be inferior to digitalis. The author has used most of the other remedies of this class in different cases. Adonidin and chloride of barium have done him good service at times. Cactus and convallaria have been disappointing. Caffeine and cocaine are both valuable, but their action cannot be kept up. There is also the risk of establishing the cocaine habit. Nitroglycerin is not of much avail.

A Form of Cardiac Dyspnœa.—Loomis ⁴⁵¹_{Apr., '94} describes cardiac dyspnœa due to a temporary slowing or permanent arrest of the blood-current in the heart. In this condition there are no organic changes within the lungs, bronchial tubes, or larynx to obstruct the entrance of air to the alveolar surfaces. When distinct valvular changes are present, with consequent hypertrophy and secondary dilatation, the gradually-developing chain of symptoms persists and gives warning of the approach of the more serious conditions. But when, on the contrary, the entire history is one which does not direct attention to the heart, and when even a physical examination shows few, if any, signs of cardiac disease, it is quite possible, and it often happens, that the exact nature of the case is not detected nor the changes which attend it fully appreciated. It is just because it is more commonly the result of

obscure changes of the arteries and cardiac walls, rather than of valvular lesions of the heart, that its study is important. The author, from recent and extended studies, has been led to the belief that these dyspnœic attacks rarely terminate fatally, even when extensive degeneration of the heart-walls exists, unless associated with arterial changes, especially in the aorta. In two instances, where an attack of dyspnoea terminated fatally, the autopsy revealed an obstruction of the coronary artery as the only cause of death. When extensive cardio-vascular changes exist a frequent cause of death is the formation of exsanguinated, fibrinous masses, which become entwined around the chordæ tendineæ of the tricuspid or mitral valve. It seems probable that in such cases, during the stasis of blood in the ventricles, which results from imperfect and feeble contraction at the commencement of an attack, cardiac thrombi are formed, and as the heart partially recovers itself the filaments of fibrin become separated and interlace themselves with the chordæ tendineæ. The curtains of the valves are thus held to the valvular opening and there results a complete arrest of the blood-current through the heart, with sudden death. Usually the arrest is in the right heart, and, as a result, the blood is shut off from the pulmonary artery. The lungs, under such circumstances, will be not only free from congestion, but more or less bloodless, while the other internal organs will be found intensely congested. If the obstruction is in the left heart the blood-current will be arrested in its passage to the aorta, the lungs will be intensely engorged, and the other internal organs will contain less than their normal amount of blood. The primary or predisposing cause, in the cases of true cardiac dyspnoea, seems to be a gradual failure in the contractile power of the heart,—in the mechanical force of the circulation. The exciting cause of the dyspnœic attack is anything which causes a heart-failure to reach such a point as practically or completely to arrest the cardiac circulation. Thus, it may be caused by physical exertion, mental excitement, the relaxation of the physical forces which comes in the early hours of the morning, or the pressure of a distended stomach. A fully-developed attack usually comes on with a sense of constriction across the chest, which is immediately followed by a gasping for breath, accompanied by spasmodic contraction of the respiratory muscles. The surface of the body becomes pale and

cold, the countenance extremely anxious, and the patient, if the attack is not too severe, is constantly changing his position with the hope of obtaining relief. Painful muscular spasms often occur in the voluntary muscles in different parts of the body. The mind remains clear; the pulse becomes feeble, irregular, and intermittent; and frequently there will be a prolonged absence of the radial pulse. This form of cardiac dyspnoea presents a peculiarity in the relation of pulse to respiration as distinct from all other forms of difficult breathing; that is, the return of the pulse precedes instead of following the subsidence of the dyspnoea.

The symptoms which precede an attack are few, but they are diagnostic. One of the earliest and most constant, and one which may exist for months, perhaps years, before the occurrence of a fully-developed attack, is an occasional sinking or exhausted sensation in the præcordial region. This sensation will come on from very slight causes, such as sudden physical exertion or strong mental emotion. In some instances the patient will complain of a choking sensation, commencing in the cardiac region and passing rapidly to the pharynx, which comes on immediately after taking food or at the moment of falling asleep, when it is often very oppressive and, to nervous subjects, alarming. So-called dyspeptic symptoms often accompany it. Sooner or later there will be established an irregularity in the cerebral circulation, indicated by attacks of vertigo, headache, hissing sounds in the ears, and occasional dimness of sight. For a long time these symptoms may cause the patient no serious inconvenience, but eventually a series of obscure nervous phenomena will develop. He will become melancholy, perhaps hypochondriacal, and very likely be treated for neurasthenia or congestion at the base of the brain. At intervals attacks of faintness, with pallor, will occur, and the patient will be troubled with insomnia; his mental faculties will be disturbed, and slight physical exertion, such as going up stairs, will cause breathlessness. In one who presents these symptoms an attack of cardiac dyspnoea is likely to occur at any moment.

The physical signs are well marked and usually distinctive. The cardiac impulse is feeble and difficult to locate; there is usually an epigastric tremor. The heart's action is irregular in force and rhythm. The first sound of the heart is short and valvular in character, and during periods of great cardiac irregularity

it is difficult to distinguish the first from the second sound. In the majority of cases there are no cardiac murmurs and no evidence of valvular insufficiency. There will be an entire absence of any pulmonary or laryngeal changes sufficient to produce the general symptoms, and examination of the urine will usually prove negative.

Asystole and its Treatment.—Huchard ^{July 26, '94}₁₆₄ states that this has been confounded with a mere disturbance of rhythm, with tachycardia, and with cardiac dyspnœa, but that it is a condition of the heart, and not a mere symptom. The picture drawn of it by Raynaud is as follows: The face puffed, the eyes brilliant, the nostrils widely dilated, the chest heaving; the unfortunate patient is in the condition of a man who has exhausted himself running; his lips and cheeks are blue, his pulse imperceptible, the veins of the neck turgescient and undulating; there are anasarca and orthopnœa. Worn out with lack of sleep, he tries in vain to enjoy a few moments of repose, being placed between the cruel alternatives of either asphyxia or entire loss of sleep. At the autopsy the asystolic heart presents, side by side, a great number of lesions,—dilatation of the cavities, degeneration of the myocardium, and inflammatory changes; but no one of these lesions gives rise to a special form of asystole. Cases may be divided into acute or transitory on the one hand, and permanent asystole on the other. Thus, a prostitute at the time of the carnival indulged in mad orgies, and, although she had never had heart-symptoms before, she was taken violently ill, at the end of this period of excess, with the most complete symptoms of asystole—pulmonary congestion, hæmoptysis, general anasarca—and, nevertheless, she recovered. In these acute cases it is probable that merely the elasticity of the muscular fibres is diminished and that their structure is as yet but little degenerated. In the permanent form of asystole physical examination discloses some enlargement and tenderness of the liver; hyperæmia and œdema of the lungs, as shown by subcrepitant or fine crepitant râles at both bases; a cardiac systole which is soft, unequal, and irregular; a diffuse apex-beat hard to detect; the apex displaced outward and downward, and the cardiac dullness increased in an horizontal direction. The first sound of the heart is more or less muffled or weakened; the second sound somewhat sharp, especially over the pulmonary valves; the pulse is rather

feeble; the jugular veins are somewhat swollen and undulating; the urine is scanty and concentrated.

Besides the asystole due to cardio-vascular conditions there is another form, of nervous origin, and this latter is favorably influenced by applications of electricity and the exhibition of caffeine, ergotine, and strychnine. Asystole of nervous origin is met in exophthalmic goitre, at the end of prolonged attacks of paroxysmal tachycardia, in certain cardiac forms of typhoid fever in which the nervous element preponderates, in influenza, in certain cases of diphtheria with a neuritis of the cardiac plexus and a consequent paralysis of the heart, in pulmonary tuberculosis where the vagus is compressed by glands, and in multiple neuritis of infectious origin. The asystole of cardio-vascular origin comes to a fatal termination by asphyxia. The nervous form ends more suddenly, by syncope. In the nervous form digitalis often fails, and should yield place to subcutaneous injections of caffeine, sparteine, strychnine, and also to the use of electricity. In the cardio-vascular form the patient presents the three chief indications for the employment of digitalis, namely: (1) the weakness of cardiac contractility; (2) diminution of arterial tension, with increase of venous tension; (3) a scanty renal secretion, with œdema and visceral congestion. Much depends upon the proper manner in which the drug is exhibited. The patient should first be put to bed, for repose is, as it were, a mechanical form of digitalis. The diet should be largely, if not exclusively, composed of milk for several days, in order to predispose the system to the diuretic action of the drug; then, on the second or third day, a purgative, such as calomel and resin of scammony or compound tincture of jalap, should be given. On the following day should be administered at one dose, not repeated, 40 or 50 drops of a solution containing 1 part of crystallized digitaline in 1000. Fifty drops of this solution is equal to 0.001 gramme ($\frac{1}{64}$ grain) of crystallized digitaline, or to 0.004 or 0.005 gramme ($\frac{1}{16}$ or $\frac{1}{12}$ grain) of amorphous digitaline. Good results may fail to appear on account of the condition of the heart or of the circulation. There may be, as it were, a blocking up of the circulation, either central, peripheral, or visceral. If the obstruction is cardiac, because of great dilatation of the heart's cavities, with a tendency to cardiac thrombosis, the removal of 200 or 300 grammes ($6\frac{1}{2}$ or $9\frac{1}{2}$ fluidounces) of blood by

the lancet may bring about a condition in which digitalis will work satisfactorily. Again, if there is very great œdema of the extremities, the capillaries and arterioles are compressed and the necessary preliminary to the use of digitalis is scarification of the extremities. Or, finally, the obstruction of the circulation may be due to congested viscera—for example, the liver—and the preliminary treatment should consist in a few doses of calomel and in the application of wet cups to the hepatic region. If there is degeneration of the myocardium, digitalis is not absolutely contra-indicated. It has been said that high arterial tension renders the use of digitalis improper, inasmuch as this drug increases the tension of the arteries, but it should be considered that the diuresis which follows its employment soon restores the pressure to a proper equilibrium. When employed at all, digitalis should not be used with too much timidity nor for too long a time, and it should not be associated with antipyrin, belladonna, nor opium. These tend to close up the kidney, while digitalis acts as a diuretic. Iodides and nitrites are also incompatible with digitalis, because they lower the arterial tension, while digitalis increases it. When the cardiac patient has suffered repeatedly from asystole, it is the author's habit, with a view of preventing further attacks, to prescribe regularly, every two or three weeks for several months or for a year, 30 or 40 drops of a solution of digitaline, 1 part to 1000, for one single day; or, alternately every two weeks, one dose of digitaline and four to six doses of 0.5 gramme ($7\frac{3}{4}$ grains) each of theobromine, in cachets, to be given in the course of two or three days. Another good remedy is as follows: Powdered digitalis, scammony, and squills, of each 1 gramme ($15\frac{1}{2}$ grains); to make 20 pills, of which 4 or 5 are to be given daily for three or four days.

Pseudo-aortic Insufficiency.—Leyden,⁶⁹_{Feb. 15, '04} while showing the diseased heart of a patient who had insufficiency of both mitral and aortic valves, but never presented a diastolic murmur during life, takes occasion to speak about certain cases reported by Litten, and which the latter calls pseudo-aortic insufficiency, in which are presented the hammer-pulse, subsultus of the arteries, vibration of the large vessels in the neck, a capillary pulse, abnormal sounds in the arteries, a double tone in the femoral, and a peculiar or characteristic sphygmographic curve, together with an increase of the heart toward the left and a heaving impulse, but without a diastolic

murmur or any lesion of the aortic valves. In three such cases, reported elsewhere, ⁴_{Feb. 12, '94} the normal condition of the aortic valves was demonstrated at the autopsy.

A Diastolic or Presystolic Murmur without Valvular Disease in Children.—Theodore Fisher, of London, ²_{Apr. 23, '94} speaks of a diastolic or a presystolic bruit, heard in children in cases where there is no mitral stenosis, but a combined dilatation of the left ventricle and of the mitral orifice. In certain of these cases a systolic thrill is present. The presystolic rumble of a dilated heart is, however, probably too low pitched to lead to much difficulty in diagnosis, and when changed for a diastolic sound the accentuation and rhythm may be that of the *bruit de galop*. There is, however, a diastolic murmur heard in the dilated heart of children which is presumably due to that dilatation, and is indistinguishable from the diastolic sound of mitral stenosis. It may be best heard at the impulse, or just outside of it, or over the right ventricle in the third and fourth or fourth and fifth intercostal spaces. In one position it is probably produced in the left ventricle, and in the other in the right. In the same heart it may sometimes be best heard in one position and sometimes in the other, and then probably points to general dilatation.

Adherent pericardium is the most common cause of a dilated heart in childhood, and death from such a cause is far more common at that age than from mitral stenosis. With regard to prognosis, therefore, it is desirable to determine, if possible, whether a diastolic murmur in a child indicates dilatation of the heart or mitral obstruction.

The Bradycardia of Convalescence.—Dehio ⁹⁹_{Mar. 22, '94} refers to the slow pulse which is sometimes noted during convalescence from acute disease, the rate being sixty or less per minute. He concludes that the cause of this bradycardia is to be found in the heart itself, and not in some change in its nervous mechanism. The occurrence of this rare symptom may be due, he suggests, to the toxic action of some specific material produced in the organism during the course of an infectious disease, but he considers it probable that an individual predisposition also exists.

Rupture of the Chordæ Tendineæ of the Mitral Valve.—Hawthorne ²¹³_{July, '94} presented to the Glasgow Medico-Chirurgical Society, in April, 1894, a specimen presenting rupture of the chordæ ten-

dineæ of the mitral valve, taken from a man of 35, who had never had rheumatism, and whose health had always been good until three years before his death, when he had been obliged to give up training in a boat's crew because of a "weakness in his body" which had gradually developed at that time. Buchanan²¹³_{July, '94} presented, at the same meeting, a specimen illustrating rupture of the chordæ tendineæ of the mitral valve, taken from the body of a laborer, aged 55, who had a probable history of rheumatism. The heart was enormously enlarged, from hypertrophy and dilatation of both ventricles and the right auricle, and weighed 910 grammes (29 ounces). The aortic valves were incompetent. The mitral valve admitted three fingers, its anterior curtain presenting a very irregular fringe of ruptured chordæ tendineæ; the ruptured tendons were eight in number, and the free extremities of some of them were bulbous and granular from endocardial thickening. One of the papillary muscles showed complete severance of all its tendons, being surmounted by short, smooth, slightly-bulbous stumps. Two other muscoli papillares presented ruptured tendons.

Hydraulics to Explain the Forms of Stenosis.—Harry Campbell,⁶_{Feb. 10, '94} in a brief but interesting article, speaks of the significance of the funnel-shape and button-hole openings in the stenosis of cardiac valves, showing that these shapes permit the largest amount of fluid to pass through the orifices in the affected valves. If the conditions are such as to make the valvular membrane a more or less plane surface, the greatest discharge of fluid is through a slit-like orifice. Where the orifice is approached by a funnel-shaped passage, a circular opening is the best outlet.

TREATMENT.

Dubois, of Berne,²¹⁴_{May 15, '94} reports a case of paroxysmal tachycardia in which compression of the vagus gave immediate relief. The pulse fell, within ten seconds, from 140 to 96, and the attack was terminated. The manner in which this compression should be employed is as follows: The carotid artery is sought by the thumb or the first and second fingers, and is compressed from before backward against the vertebræ, care being taken that the artery does not slip out to one side from beneath the finger. The procedure is not without danger, and should be employed cautiously at first.

Nelson Hardy²_{Oct. 14, '93} reports the successful employment of oxygen in a case of cardiac failure where there was no organic heart disease. At the time of its use there was marked intermission, with great feebleness and dyspnœa and utter prostration. During the first exhibition the intermissions, which had been five or six in the minute, entirely disappeared; the pulse gained in strength and volume, and the patient declared herself far more comfortable. The inhalations were continued daily, sometimes two and sometimes three times a day, for three months, with continued improvement in the patient's condition.

Thorn⁶_{May 6, '94} describes the treatment of chronic diseases of the heart by baths and exercises, as elaborated by August and Theodor Schott. The baths most frequently employed in the system under consideration are those of Nauheim, containing about 1.5 per cent. of chloride of sodium, with about the same amount per thousand of chloride of calcium, salts of iron, etc., and a proportion of carbonic-acid gas, which is made to vary according to the circumstances of the case. The water possesses a natural temperature of from 88° to 95° F. (31.1° to 35° C.). Baths may, however, be artificially prepared to fulfill almost, if not quite, the same therapeutic purpose. A pause is made after each second, third, or fourth bath taken in daily succession, and it is prescribed that each bath shall be followed by an hour's rest in the recumbent position. Generally speaking, the effects of the baths are: cutaneous excitation, amounting, in the stronger effervescing baths, to rubifacience; a sense of refreshment not inconsistent with the prescribed hour of rest, stimulation of the appetite, and an eventual gain in weight. Their effect on the pulse is at once to reduce its frequency and to increase its force, and very soon the heart expels the blood-stream faster than it can return; indeed, the efferent vessels, down to the smallest arterioles, seem to be stimulated to greater carrying-capacity and functional activity. At the same time the congested viscera are made to partake in the effect of the general health-restoring impulse.

The exercises are denominated "resisted movements." *Wil-erstands-Gymnastik* consists of exercises calculated to bring into successive and regulated action almost every collective system of voluntary muscles which is comprised in the human frame. The patient is instructed to breathe slowly and regularly through-

out their employment, and to warn the attendant of any approach to palpitation. The attendant is to resist each of the prescribed movements with a measure of force which just falls short of that which would be necessary to arrest it, to impose a short interval between each movement, and so carefully to watch the patient as to avoid sweating and the slightest distress of breathing. The dimensions of the heart and the character and quality of its sounds should be ascertained by the physician before and after each series of exercises, and, if necessary, intermediately. Their effect on the pulse is to increase its force. Diminution in its frequency is often delayed for a few days, but not so the diminution in size of a dilated heart. As a general rule, the exercises are not continued for more than one-half hour at a time. Theodor Schott, as a result of eighteen years' experience, affirms that benefit should be expected to accrue in all cases of chronic heart disease, whether of valvular or parietal nature, except where such conditions have led to or co-exist with either advanced myocardial or arterio-sclerotic degeneration or aneurism of either the heart-wall or a great vessel. Thorn himself bears witness to improvement, amounting to practical cure, in such cases as the following: Stenosis of either the aortic or mitral orifices; stenosis of both; insufficiency of either or both; dilatation consequent on myocarditis, on habitual hæmorrhage, and on anæmia; fatty degeneration of the heart (not interstitial); weakened heart; congenital mitral insufficiency; patency of the foramen ovale; and angina pectoris of both neurotic and organic causation. Smyly¹⁶_{Sept. 1, '94} and Babcock⁷⁹_{Sept., '94} both bear testimony to the value of the Schott treatment of chronic heart disease.

Eccles¹⁵_{Aug., '94} advocates mechanotherapy in chronic diseases of the heart. Generally his patients have been kept at rest in bed for a period varying from a fortnight to a month. Either immediately, however, or after the lapse of a few days, general corporeal massage has been administered, at first once and after a time twice daily. As the patient becomes habituated to the massage, passive movements of the limbs are practiced, the number and character of these varying with the state of the case. Next, active movements of the limbs assisted by the attendant are prescribed. Very shortly after the initiation of these slight exercises they are followed by unassisted systematized movements, and by degrees

resistance is offered by the manipulator to the active exercises practiced by the patient. The utmost care must be taken to avoid overexertion. All the foregoing treatment is employed while the patient still remains in bed, but, as the massage and exercises practiced in the recumbent position become more easily borne, removal from the bed to a couch is permitted, and the exercises are practiced in the sitting posture. Finally, locomotion is permitted, and exercise in the open air is added to the in-door manipulations. The cases in which the combination of rest and massage with systematic exercises has proved most useful are those in which cardio-arhythmia with palpitation and intermittent and irregular pulse, breathlessness on exertion, cold-blue extremities, and enfeebled digestion have been associated with the physical signs of dilatation, sometimes accompanied by a systolic bruit, after one or more attacks of influenza.

Jullien¹_{May 5, '94} is said to regard the application of an ice-bag over the heart as a powerful therapeutic measure. It raises the blood-pressure rapidly and considerably diminishes the frequency of the pulse. The beneficial effects show themselves in from fifteen to twenty minutes from the beginning of the application, and reach their maximum at the end of an hour. It is true that they are very evanescent, disappearing rapidly when the application is suspended, but there is no danger in prolonging the application as long as the general condition remains precarious. One fortunate case was a girl with typhoid fever, whose temperature had remained all the time above 104° F. (40° C.), and whose pulse had reached, successively, 120, 140, and 160. Apparently the ice-bag saved her life.

Glinski¹_{Sept. 8, '94} has satisfied himself, by experiments on animals, that *Apocynum Cannabinum* contains an active cardiac tonic. Moreover, being himself affected with hypertrophy of the left ventricle, with dilatation, mitral murmur, etc., he took 15 drops of the fluid extract daily in three doses. All the functional symptoms were ameliorated, and he made further trials in other cases and obtained the same success. He concludes that the root of *Apocynum Cannabinum* has properties similar to those of digitalis. [Similar claims have already been made by Murray.—Ed.]

Seymour Taylor,¹⁰⁷⁷_{May 16, '94} writing of the therapeutics of heart disease, states, of the *Prunus Virginiana*, or American wild cherry:

“My attention was first called to it some years back by an article in one of the journals by Dr. Clifford Allbutt. I can reiterate all that he says in praise of the drug. It relieves the flagging and distended ventricle of the chronic bronchitic, it stimulates the flagging chambers of the anæmic, and it increases the muscular tone in subjects recovering from fever and other exhausting diseases. It is also given with great advantage in the irritable, ‘convulsive’ heart of the overworked man of feeble physique. It is especially useful in dilatation of the right heart, whether as result of chronic bronchitis or of mitral stenosis. I use it more in private than in hospital practice, and perhaps no drug has brought me so much credit. It is an excellent adjunct or substitute for digitalis, but I do not mean to say that it can ever replace that drug.”

[The National Dispensatory of the year 1894, in speaking of *Prunus Virginiana*, says: “Palpitation of the heart is reputed to be especially under its control. When this symptom depends upon organic causes the medicine is inadequate to allay it, except in a very slight degree; but when it is associated, as it more frequently is, with anæmic, chlorotic, dyspeptic, or nervous disorders, the bark is sometimes of real advantage.”]

Sir Andrew Clark, ⁶_{Dec. 2, '93} in a clinical lecture delivered at the London Hospital, described the proper treatment of a case of mitral stenosis occurring in a young man (who had also some imperfection of the aortic as well as of the mitral valve). In the first place he should be warmly clad in order to protect him from colds, and he is not to use cold water for his ablutions. He is to have three good meals a day, but as dry as he can make them. For breakfast cold chicken, bread and butter, fish, cold meat, with not more than $\frac{1}{2}$ pint ($\frac{1}{4}$ litre) of liquid; for dinner, meat, bread, potato, green vegetables, milk-pudding, and cold fruit, but if rheumatic no fruit; and he is to drink water, or, if the heart is likely to flag, water with from $\frac{1}{2}$ to 1 ounce (15 to 30 grammes) of any good spirit put into it, not beer and not wine, particularly not sparkling wine. For supper, toast and butter, a cutlet, game, and another $\frac{1}{2}$ pint ($\frac{1}{4}$ litre) of liquid. If $1\frac{1}{2}$ pints ($\frac{3}{4}$ litre) of liquid per diem prove too scanty an allowance and alcohol seem helpful to him, a little alcohol may be given at night with or without a biscuit. In exercise he is to be exceedingly moderate. One of the perils of such cases is fatal congestion. To relieve the lungs give something to

move the bowels,—of sulphate of soda and phosphate of soda, in equal mixture, two or three tablespoonfuls given in the morning will deplete the portal system. If the heart seem fluttering, *strophanthus* or *digitalis* is indicated. If there is nausea, *strophanthus* will be best, 5 drops three times a day; it will be well to conjoin with it 10 drops of tincture of *nux vomica* every second or third day, with a saline aperient every other morning. If the liver is clear, iron may be added. Occasionally, in a case like this, there will be a profuse hæmoptysis, which is of mechanical origin and is nature's means of relieving the patient. We should administer some placebo, unless the bleeding is of such extent and kind as immediately to jeopardize life.

Sidney Coupland, ¹⁰⁷⁷_{Mar. 21, '94} in a clinical lecture on mitral obstruction, states, with regard to treatment, that careful management of the diet and life may render these cardiac subjects comfortable for a long time, and they may have no symptoms of the deranged valve-mechanism until the damaged heart begins to fail. When they have to be treated it must be as rationally as possible. The venous congestion from which they suffer must be relieved by frequent slight purgation,—by salines, for instance. Hydragogue purgatives are sometimes useful, and sometimes venesection may be employed. If the heart be obviously failing, of course cardiac tonics are indicated. *Digitalis*, *strophanthus*, *strychnine*, and *arsenic* are all of value to restore the healthy tone to the muscle and re-establish compensation. With regard to alcohol he says: "The longer I live the more I think that it ought to be given very sparingly indeed to people with chronic cardiac disease, and one great consideration is that, having once begun to give it in such cases, it is very difficult, if not impossible, to leave it off. It is obnoxious in that it tends to diminish the desire for food, and perhaps may actually aggravate the tendency to induration, arterial and valvular, which already exists. Alcohol should certainly be sparingly given."

Curschmann, of Leipzig, ¹¹⁶_{Mar., '94} contributes to our knowledge of the proper technique to be employed in the mechanical treatment of dropsy. He has modified the miniature trocar of Southey in certain ways which will be best understood by referring to Fig. 1, representing the exact size and shape of the instrument which he employs. It is somewhat broad and flat, with

an elliptical transverse section, and the end of the cannula, which is inserted into the subcutaneous cellular tissue, has a few openings in the side as well as the larger one at the extremity. Antiseptic precautions should be employed throughout, and the trocar and cannula should be inserted in a direction at an acute angle with the surface of the body. Parts that bleed easily should be avoided. The cannula is to be held in place by means of cotton and iodoform colodion, and the mouth of the cannula is to be covered by a rubber tube which has been filled with sterilized normal salt solution. The other end of this tube is to be immersed in a vessel partly filled

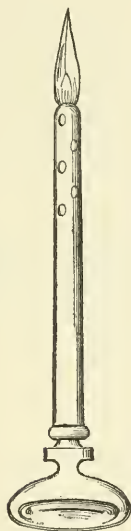


FIG. 1.

MODIFIED MINIATURE
TROCAR. (CURSCHMANN.)

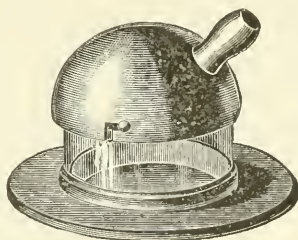


FIG. 2.

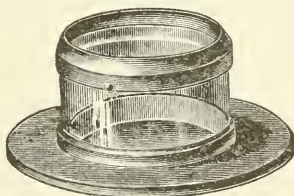


FIG. 3.

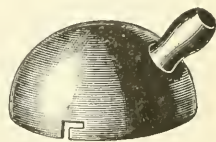


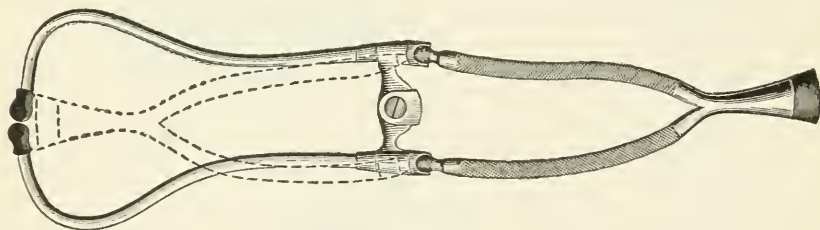
FIG. 4.

APPARATUS USED IN CASES OF DROPSY. (CURSCHMANN.)
Therapeutische Monatshefte.

with a similar fluid. Thus a siphon-action is set up. The author applies these minute trocars to the thigh or the abdominal walls, and he very seldom uses more than four at one time. Another method which Curschmann employs for the same object is by means of an air-tight chamber to which a rubber tube, as previously described, is connected to draw off the subcutaneous fluid through incisions in the skin; the small chamber which is applied to the skin (Figs. 2, 3, and 4) has a removable cover. The mode of using the little apparatus is as follows: A suitable part of the skin is selected and made aseptic, and the sterilized receptacle is

then pressed upon this surface and fastened in place with cotton and iodoform collodion. Then some three or four incisions are made through the cutis, the cover of the receptacle fitted on (air-tight), and the rubber tube arranged as with the cannula.

Wilcox, of New York, ¹_{July 14, '94} has had made an improved binaural stethoscope, a picture of which is appended. In the present instrument the various old devices for holding the ear-pieces in place have been abandoned, and an entirely new concealed spring, carefully adjusted as to pressure, is substituted. In order to secure the best possible aërial conduction the lumen is of uniform calibre throughout, that of the pectoral extremity being twice the size of the aural tubes. The division between the conducting tubes is at an acute angle. The whole instrument is shortened as much as possible, and hinges in the middle by a ball-and-socket joint. In order to secure conduction of sound the instrument presents, with the exception of the



IMPROVED STETHOSCOPE. (WILCOX.)

New York Medical Journal.

aural and pectoral extremities, a continuous metallic connection. Lastly, the form of the pectoral opening has been changed from the various modifications of a cone to that of a parabola, thus increasing the sound-waves which reach the tympanum. After six months' trial of it by a considerable number of physicians, Wilcox feels justified in claiming that it possesses many advantages over the stethoscopes in common use. S. Solis-Cohen ⁹_{Dec. 16, '93} has modified the œsophageal stethoscope of B. W. Richardson by introducing between the stomach-tube and the ear-tube a rubber capsule containing a diaphragm of gold-beaters' skin. This serves as a barrier to the contents of the stomach and also as a resonator. As to the importance of intra-thoracic auscultation the author cannot as yet speak positively. He considers it one of the methods that we may usefully employ among others in making exact observations.

DISEASES OF THE MOUTH, STOMACH, LIVER, AND PANCREAS.

By ALFRED RUBINO, M.D.,

NAPLES.

DISEASES OF THE MOUTH.

General Considerations.—Clifford ⁶¹_{Jan. 13, '94} regards an unhealthy condition of the oral cavity as an important factor in the causation or aggravation of diseases, the primary causes of many pathological lesions of the nervous system, alimentary tract, kidneys, etc., having been shown to lie within its boundaries.

Rosenbach, ⁷⁴⁸_{Apr., '94} in speaking of the care of the mouth in sick persons, says that in many illnesses there is almost sure to be secondary trouble in the mouth if preventive measures be not taken. Patients with good digestive powers, free from fever, and with no loss of consciousness require no more than the ordinary care of the mouth. In children and very old patients the less solid food is taken the greater should be the care of the mouth, which should be rinsed several times a day with lukewarm water, containing a little common salt, tincture of myrrh, or *eau-de-cologne* to stimulate secretion. When there is a tendency to bleeding of the gums or when the teeth are bad a pinch of powdered boric acid may be twice daily rubbed in between the lips and the gums. Patients should remove false teeth when, owing to loss of appetite or chronic gastric disturbance, they cannot take solid food. In patients with partial loss of consciousness the mouth should be examined several times a day for small sores, such as may arise from the pressure of the teeth on the lips, etc. Such sores should be powdered with a little boric acid or chlorate of potash. Cracks and the corners of the lips heal quickly if dried with a clean towel and treated with boric acid or vaselin. The mucous membrane may be stimulated by wiping the tongue and mouth and pressing on the tongue with a moist towel every two or three hours; if necessary, the posterior part of the tongue should be cleaned with a wad of cotton-wool fastened to

a stem. If the patient sleep with the mouth open the air in the room must be kept moist; a moistened layer of muslin laid on the mouth may be of some service. Patients with fever should have something to drink—cold water or weak lemonade—at least every hour, without waiting until obliged to ask for drink. Besides preventing dryness the fluid maintains the activity of the glands and the whole function of the mucous membrane. Many patients are prevented from drinking by a painful, dry, and cracked condition of the lips, and therefore all feverish patients should, from the commencement of their illness, have their lips rubbed several times a day with vaselin or fat. In protracted cases of fever the mouth may also be swabbed out with oil, fat, or largely-diluted glycerin.

A specially-appointed committee of the American Pediatric Society ⁵¹ Aug., '94 presented, at the meeting in 1894, a revised nomenclature of diseases of the mouth, which was adopted as provisional for the purpose of getting rid of imperfect and misleading names and to enable writers in different parts of the world to understand whether they were writing about the same or a different disease, and thus to receive some benefit from each other's investigations. The nomenclature is as follows:—

STOMATITIS . .	{	Catarrhalis . . .	{ Simplex.	{ Secondary to the Exanthemata.				
		{	Exanthematica.		{ Mechanical,			
			Traumatica.			{ Thermal,		
	{	Herpetica. . . .	{ Aphthosa.		{ Chemical.			
	{	Ulcerosa	{ Scorbutus.		{ Arsenic,			
			{			Mineral Poisons	{ Lead,	
				And other diseases.		{ Mercury.		
	{	Mycetogenetica.	{	Hyphomycetia	{ Thrush.			
				{		Pseudomembranosa . .	{ Diphtheria,	
{						Gangrenosa.		{ Tuberculosis,
						{ Syphilis, and		
{				like diseases.				
{	Noma.							

Stomatitis.—Boenmecken ⁶⁹ Jan. 11, '94 believes that all acute and sub-acute inflammations of the buccal mucous layer described under the name of stomatitis are of parasitic origin, and that the manifold forms (*S. epidemica*, *ulcerosa*, *scorbutica*,—stomatitis accompanying typhus, articular rheumatism, etc.) are only variations of the same disease, whose symptoms show the greatest differences.

The etiological factors are to be considered under three heads: (1) predisposing causes; (2) local irritations; (3) parasites. The predisposing causes are troubles of nutrition, bad hygienic conditions, and constitutional diseases which enfeeble the heart's energy and favor venous stasis and serous transudation in the oral mucous membrane, especially of the gums and interdental spaces, making the development of stomatitis easier. Much more important are the local irritations, as decayed teeth, remains of dental roots, and all mechanical, thermal, or chemical actions. As regards the influence of parasitic germs, it seems well demonstrated that stomatitis must not be considered as an infection of the mucous membrane by a special inflammatory agent, but rather as a mixed infection. As for treatment, the care of the mouth is of paramount importance in every infectious disease and constitutional disturbance, in order to prevent putrefactive processes in the mouth; all local causes of irritation are also to be removed. The value of antiseptic applications is generally accepted, but the solutions of chlorate of potassium and permanganate of potassium commonly used are not sufficiently concentrated to have an antiseptic action, especially when the short time they can remain in contact with the mucous membrane is taken into consideration. Moreover, these strong solutions are apt to be painful. The author strongly recommends solutions of peroxide of hydrogen,—which is not poisonous, does not cause pain, and has an effective antiseptic action even in solutions as weak as 2 per cent., or even less. Fœtor is corrected in a few minutes, and its continued use is followed by a marked improvement in the condition of the epithelium in twenty-four hours, and complete cure of even severe cases in five or six days.

Landgraf⁴_{Jan. 1, '94} reports a case of stomatitis aphthosa, suddenly developed in a man 32 years old, with high fever and severe constitutional disturbances, after taking several doses of quinine for ague. The disease lasted twelve days and the patient's recovery was complete, but after again taking quinine he had the same form, only a little milder. Landgraf considers this case as an example of an inherited idiosyncrasy for quinine.

In a case described by Hamilton,²⁸²_{Apr., '94} a form of aphthous stomatitis affecting all the lining mucous membrane as far back as the soft palate and uvula, was accompanied by very marked con-

stitutional disturbance and by a cutaneous eruption resembling herpes iris. On inquiring into the previous condition of the patient it was discovered that since his ninth year he had been subject to recurring attacks of inflammation of the mucous membrane and skin, among the causes of which were cigarette-smoking, inhalation of sewer-gas, and the local irritation of a poisonous weed. It is well known that local irritation and defective sanitation may act as causes of herpes iris.

Maurel, ¹⁴_{July 25, '94} from experimental researches, comes to the conclusion that stomatitis due to mercurialization is brought about by the action of the microbes normally present in the mucous secretion, their unwonted activity resulting from the paralyzing by the mercury of the phagocytic function of the leucocytes.

Buisseret ⁷⁸¹_{Dec., '93} tabulates the results of his valuable studies on the pathogeny of gingivitis as follows: 1. All cases of gingivitis, whatever may be the initial cause, are traceable to a unique septic form and must, therefore, be treated by the same local method,—viz., antiseptics,—whilst the internal treatment is to be regulated according to the nature of each case. 2. The degree of virulence of the buccal micro-organisms has not yet been determined. 3. Pathogenic specific microbes of gingivitis have not yet been distinguished from those of stomatitis. 4. The blood-supply of the gums is almost entirely maintained by capillary vessels and hence is very slow; there is, therefore, an anatomical disposition favorable to inflammation, chiefly in the alveolar folds, where the blood-vessels bend abruptly.

According to Orakhovatz, of Lovetch, ²⁶_{June 1, '94} the best treatment of stomatitis ulcerosa consists in gargling the mouth with a solution of chlorate or permanganate of potassium before and after meals, and in inserting afterward an iodoform-, boric-, or salicylic-gauze compress between the cheek and gums on the diseased side. This compress is removed before partaking of a repast, and renewed afterward, care being taken always to use the gargle before inserting the gauze.

Ulceration.—Louis Wickham ¹⁴_{Jan. 21, '94} describes peculiar ulcerations of the mouth occurring in the course of tabes dorsalis, and found wholly or partly in the alveoli. They are atonic, indolent, and chronic; exploring with a probe often shows an orifice through which an exposed bone-surface is touched; there is total or partial

absence of teeth; the maxillary bones are deformed. This affection may be either a trophic trouble directly dependent on tabes or a severe alveolo-dental periostitis, the development of which would be favored by tabes. For this affection Fournier proposes the name of "*mal perforant buccal*."

Letulle¹⁴_{July 22, '94} reports a case of perforation of the hard palate, without suppuration, in an ataxic and syphilitic patient who had already had several similar lesions on the soles of his feet. Giraudau¹⁴_{June 10, '94} observed a man, 42 years old, in the first stage of phthisis, who presented some tubercular ulcerations of the gums, which gave rise to a tubercular osteo-periostitis. Ulcerations of the gums are ordinarily superficial and little extended in length. This case shows that they may occasionally be as deep and destructive as any other tubercular ulceration, as of the soft palate, tonsils, and tongue. Broes Van Dort⁴¹_{July 19, '94} describes a case of Baelz's disease, or ulceration of the "*glandulæ labiales*," in which good results followed the local use of iodine tincture, as recommended by Unna.

Cancerum Oris.—A case in a boy aged 4 years is reported by Robert A. Fleming,⁶⁵_{Sept., '93} who gives a short critical review of the disease, insisting on its parasitic nature, although a specific micro-organism has not yet been isolated. A similar case was described by Gardner,²⁸⁵_{Oct. 16, '93} only differing from the description of noma in that the cheek was not perforated and the patient did not die of septicæmia.

Lichen Planus.—Frèche¹⁸⁸_{Jan. 14, '94} showed, to the Medico-Chirurgical Society of Bordeaux, two cases of lichen planus limited only to the mouth. In the first of these the lesions almost disappeared under arsenical treatment.

DISEASES OF THE TONGUE, SALIVARY GLANDS, ETC.

Glossitis.—Clinton Wagner⁵⁹_{Oct. 21, '93} observed a case of acute idiopathic glossitis, developed without any recognizable cause, in a man, aged 30, in good health. The sublingual gland was swollen, firm, and hard and imparted no sense of fluctuation to the touch, but on the right side and near its posterior border it was extremely sensitive to pressure. At this point a free incision was made, from which an enormous quantity of thick, creamy, fetid pus escaped. A probe was introduced and carried several inches upward

and backward, showing that the body of the tongue was involved and was undoubtedly the source of the pus. With the escape of the latter the swelling of the tongue began to subside.

Gaston ¹⁴_{Jan. 21, '94} reports two cases of that form of desquamative glossitis to which Fournier and Lemonnier gave the name of "*glossite exfoliatrice marginée*." In both cases hereditary syphilis was the predisposing cause, and the dental malformations contributed to the condition. A very puzzling case of glossitis was observed by Jullien. ¹⁴_{Feb. 21, '94} A man, 34 years old, consulted him for a lesion of the tongue interfering with mastication, deglutition, and speech, and which had resisted for one year the most vigorous antisyphilitic treatment. Despite this fact all other causes could be excluded, and, although no evident marks of syphilis were recognizable, a subcutaneous injection of calomel was followed by a rapid improvement, while a second injection, fourteen days afterward, led to complete recovery. Mendel ¹⁴_{July 22, '94} describes a case of sclerosis of the tongue in a syphilitic woman. There were prominent, irregular, lenticular, leucoplastic spots on the anterior half of its dorsal surface, produced, in great part, by a somewhat thick exudation. Removal of this by scraping showed the disturbance of the epithelial function by the presence of the remaining grayish spots. Antisyphilitic treatment was followed by rapid improvement of the leucoplasia.

Brocq ²¹²_{Jan. 10, '94} calls attention to the fact that many chronic cases of superficial glossitis, commonly attributed to syphilis or to the irritation produced by tobacco, are traceable to gastric troubles in rheumatic individuals under the occasional influence of local irritations. In these cases whitish threads are formed on the tongue and cheeks, giving to the parts an appearance very similar to that of the leucoplasia of smokers. Local treatment of these forms must be very mild, the efforts of the physician being directed chiefly against the disorder of the stomach and the rheumatic diathesis.

In a case of glossitis subsequent to an inflammation of the throat and tonsils, Ernest B. Sangree ⁷¹_{Nov. 15, '93} has recourse to the application, every half-hour, with a feather, of pure glycerin to the hard, swollen, and stiffened tongue. This procedure, doubtless from the power of the glycerin to absorb water through the tissues from the engorged vessels, rendered the tongue more movable; so

that the patient not only experienced much relief, but could also swallow with more ease.

Leucoplakia.—H. Oliphant Nicholson²_{Mar. 3, '94} regards leucoplakia as zona (herpes zoster) in one of its many manifestations. The peculiar burning sensation that accompanies the white patches on the lingual mucous membrane seems to him almost distinctive; and he calls attention to the fact that one or two herpetic vesicles may appear on the lower surface of the tongue during the course of the disease. Local applications can only be of temporary service, and internal remedies for zona are often unavailing. He advises, however, a trial of tincture ferri perchloride 25 to 30 minims (1.3 to 2 grammes) three times a day, which, in one of his cases, seemed to relieve the burning pain and improve the condition of the lingual epithelium in a remarkable manner when everything else had failed.

Leucokeratosis.—Dubois-Havenith⁸⁶⁸_{Jan. 20, '94} exhibited, to the Société des Sciences Médicales de Bruxelles, two cases of disease of the tongue. The first was a case of long-standing leucokeratosis linguæ (psoriasis linguæ) in a patient who had not suffered from syphilis. On the left border of the tongue were three white, pearly, wrinkled patches, causing much discomfort to the patient. Curetting and the use of the galvano-cautery seemed advisable on account of the possible development of an epithelioma. In the second case the patient had been suffering for six years from a leucoma of the tongue, the syphilitic origin of which appeared to be evident; but, though an exact specific treatment was instituted several times, the white patches never disappeared. This persistence was to be attributed, according to the author, to the patient's playing a horn for several hours every evening.

Lingual Papillitis.—J. B. Duplaix¹⁰⁰_{Oct. 24, '93} describes a peculiar form of glossitis localized in the papillæ of the tongue, and which had been already observed in many patients by Cotard. Owing to the location of the disease he gives it the name of "lingual papillitis." Its only symptom is a burning or lancinating pain on the anterior two-thirds of the tongue, with greater intensity on its tip and borders. The pain, often recurring at intervals in the form of neuralgic attacks, is aggravated by the ingestion of food,—solid or liquid, with the exception of milk and soups. No other trouble, either of general and special sensibility or of the salivary secretion, is observable. Examination with the naked eye does not reveal any

remarkable alteration, but examination with the magnifying-glass shows, in several places, and chiefly on the borders and tip of the tongue, some little red points, ulcerated and very painful when touched, whose number is greater in proportion as the pain is more violent. It must be admitted, therefore, that some relation exists between the symptoms and the described lesion. The seat of this lesion is evidently in the nervous terminations in the lingual mucous membrane, or, more exactly, in filiform papillæ. The best treatment is galvanic cauterization (with the aid of the magnifying-glass) of the ulcerated points, a few points being touched at each sitting.

Gazzola ²¹²_{Apr. 25, '94} gives a similar description of the above disease, of which he was able to observe several cases in the practice of Duplaix and Coupard. He confirms the good results of the galvano-cautery.

Ulceration.—Barié ¹⁴_{Dec. 24, '93} exhibited, to the Société Médicale des Hôpitaux, a man, aged 50, on whose tongue a crop of granulations developed, and, becoming confluent, gave rise to a large ulceration. Examination of the chest showed signs of tubercular softening in the fossa supraspinosa. The patient had never had syphilis. In the discussion which followed Rendu expressed the opinion that, although the ulceration gave every evidence of being of tubercular nature, its syphilitic origin was not improbable enough to convince him that it would not be advisable to try specific treatment.

Varicose Veins on the Tongue.—Ida R. Gridley ⁵⁹_{May 24, '94} describes the case of a woman, 59 years of age, who consulted her about some nervous symptoms from which she was suffering. The author noticed that both the upper and lower surfaces of her tongue were much ridged and furrowed and studded with irregular elevations, some the size of a large pea. These elevations were soft, purple, and but little covered with the ordinary coating of the tongue. The lower lip and the buccal mucous membrane were studded with similar small, purple elevations, all representing a varicose condition of the veins. The patient, questioned about the duration of this condition, said that, when she was born, a small purple tumor had been noticed underneath the chin. When she was 23 years of age, a little red speck, the size of a pin's head, appeared on her left cheek, which was diagnosed as a "spider

cancer" and treated with a fire-plaster, which produced a large sore. Immediately after the sore developed varicose veins appeared on the tongue, the cheeks, and the side of the neck. Several physicians had thought that this treatment was the cause of the varicose condition, but it seemed more probable to the author that there was a congenital tendency toward enlargement of the veins. The patient had also varicose veins under the pubis and near the anus. Aside from the discomfort produced by recurrent swelling of the veins on tongue and cheek and from their tendency to open and cause hæmorrhage, this peculiar condition gave no trouble.

Black Tongue.—Sendziak⁵⁵⁶_{July 7, '94} made a bacteriological examination of two cases of so-called "black tongue" and succeeded in growing from both, on bread-paste, a special fungus, identical with that of which cultivations were obtained shortly before, by Ciazlinski and Hewelke, from a similar case, and which was regarded by them as being the *Mucor niger*. All these observers maintain that the condition is due to the presence of this fungus. Sendziak holds the opinion that black tongue, unaccompanied by any hypertrophy of the papillæ, is really the same disease, and that the hair-like growth sometimes observed in these cases is a secondary and non-essential accompaniment. Burn Murdoch³⁶_{Sept., '94} showed, to the Medico-Chirurgical Society of Edinburgh, a specimen of a peculiar, dark, raised growth on the back of the tongue, in a man 41 years old. This growth had existed for a long time and caused no pain nor annoyance. It was fairly hard to the touch, and, inspected in a good light, was seen to be composed of numerous fibres resembling hairs and their roots. After microscopical examination of several pieces of the growth Robertson defined the case as an example of the rare condition to which the names "black hairy tongue" and "hyperkeratosis of the filiform papillæ of the tongue" have been given. The patient was an unusually heavy smoker. The affection is apparently more common in those using tobacco to excess than in others.

Macroglossia.—In the course of a few months Eickenbusch¹³_{July, '94} observed and operated upon two cases of macroglossia, one of which showed the *lymphatic form* (*hematolymphangioma mixtum*), and the other the *muscular form*, characterized by hypertrophy and hyperplasia of muscular fibres, with little connective tissue and few

vessels. The prognosis is good in both forms and operation may be successfully performed.

Foreign Bodies.—Lepage ²¹²_{Jan. 10, '94} reports the case of a man who fell from a horse, receiving, besides many bruises, a wound on the tongue, which became swollen. This wound healed after a month, but an induration persisted, causing the patient much trouble. Three months after, a whitish point appeared upon the spot, and sounding throughout with a probe revealed the presence of a hard body; the induration was then cut, and the body—a double molar tooth—was extracted.

Tumors.—J. Rosenstein ⁵⁹_{Sept. 23, '93} describes two cases of lipoma of the tongue, followed by the appearance of similar symmetrical tumors in other parts of the body. The first case was that of a man, aged 31 years, enjoying excellent health, in whom a tumor gradually developed on the right side of the base of the tongue. This tumor was of the size of a large English walnut, yellowish-tinged, of soft consistency, pseudofluctuating, and reached from the anterior surface of the posterior plicæ glosso-palatina to the somewhat-enlarged tonsil, forming, with this, an apparently-continuous tumor. It had been mistaken for a sarcoma; but Rosenstein made a diagnosis of lipoma, which was confirmed by microscopical examination, after a complete and successful extirpation with a galvano-caustic snare. A few weeks later a tumor of the same kind formed on the left arm, and three months later another on the right arm. Both were extirpated and healing was perfect without further reproduction. The other case was that of a negro, aged 53, in very good health, in whom swellings made their first appearance on the median line, extending along the nape of his neck, and subsequently on the inner side of his thighs, on his arms, breasts, and legs, on the outer side of the lower jaw, and on the inner and outer sides of the mouth, etc. They were of lipomatous nature, and, with the single exception of a tumor in the scrobiculus cordis, caused him no particular discomfort; so that he was opposed to any sort of operation. Rosenstein believes that these cases depend upon a central cause, whether of the skin-glands only remains to be seen.

E. K. Dunham ⁵⁹_{Aug., '94} presented, to the New York Pathological Society, a sarcoma of the tongue removed by operation from a man, 61 years of age, whose family history was negative, except that

several of its members had died of tuberculosis, and who was somewhat alcoholic in his habits and accustomed to smoke ten pipes of tobacco a day. On microscopical examination the structure of the tumor appeared to be that of a large round-celled sarcoma. This form of sarcoma in the tongue is very uncommon.

E. W. Stevens¹¹⁹_{July 14, 94} discusses the diagnosis and treatment of cancer of the tongue,—one of the commonest and most terrible manifestations of this malignant disease. It is always of one variety,—the squamous-celled carcinoma or epithelioma. The great majority of cases occur between the ages of 45 and 60. The relation of the disease to sex is nearly as striking as the relation to age, males being affected about six times as frequently as females; this is, no doubt, owing to the fact that spirit-drinking, smoking, and rough eating are relatively more frequent among the male sex. No part of the tongue is exempt from carcinoma, but the anterior half is the one commonly affected, and the edges more frequently than the dorsum or under surface. Heredity does not seem to be an important factor in the production of this disease. A large majority of cases of cancer of the tongue are preceded by an abnormal condition of its surface, called leucoma by Jonathan Hutchinson and chronic epithelial glossitis by Besnier. The first appearance of carcinoma may vary within very wide limits. It may commence as a fissure or ulcer, a pimple or tubercle, a wart or warty growth, more rarely as a lump or nodule in the substance of the tongue. There is ample proof that many of these forms of disease in which cancer first appears are at first, and for a long time, simple non-cancerous affections, which, being subjected to irritation, gradually change into cancer. The most common sources of irritation are irregular and rough teeth, smoking, spirit-drinking, and, above all, the application of a caustic, as the nitrate of silver. No clear line, either clinically or histologically, can be drawn marking the transformation of a simple into a cancerous condition; so that any apparently-simple lesion of the tongue, which does not yield to treatment after every source of irritation has been removed, should be excised at once, even in the absence of definite signs of cancer. When fully developed, lingual cancer, while widely different in different cases, presents a striking clinical picture. The increasing ulceration and induration; the pain, often referred to the ear or temple; the sali-

vation; the fixation of the tongue from infiltration, so that it can no longer be protruded from the mouth; the enlargement of the lymphatic glands beneath the angle of the jaw; the gradually-increasing difficulty of speech and swallowing; the not infrequent hæmorrhages; and the progressive exhaustion mark the onward march of the affection. The diseases with which cancer of the tongue is most likely to be confounded are: syphilitic lumps and ulcers, tuberculous ulcer, warty tumors, and simple ulcers and fissures. Simple ulcers and fissures heal rapidly, without treatment, when the source of irritation is removed or under the use of simple applications. There is one form of simple ulcer—the dyspeptic ulcer—which, while it improves under treatment, is prone to recur; but it is superficial and without induration, usually multiple, and appearing in successive crops. It is not likely to be mistaken for cancer. The diagnosis between cancer and tuberculous ulcer of the tongue is often most difficult, but the mistake cannot be regarded as a serious one, the best treatment of the tubercular ulcer being by excision. Secondary syphilitic affections of the tongue would probably seldom or never be mistaken for cancer, and in chancre of the tongue the early glandular involvement and the development of secondary symptoms will make clear the nature of the disease. Great difficulty, on the contrary, sometimes attends the diagnosis of lingual cancer from the ulceration of tertiary syphilis, and it is often impossible to distinguish between them without antisyphilitic treatment, which, when there is a shadow of doubt, should always be employed. Finally, there is only one method of treatment of lingual cancer,—removal by surgical operation,—which not only effects a cure in a small number of cases, but usually prolongs life and nearly always affords great relief.

J. Hutchinson ⁸⁰⁶_{Jan., '94} excised a portion of the tongue of a man in which an ulcer had formed in connection with a sharp tooth. The ulcer was small, clean, and quite superficial, but had a rolled edge and a slightly-hardened base. It had been present only a few weeks. No return of the disease ever took place in the tongue itself, but the patient died two years later from secondary disease of the glands of the neck. This case shows the possibility of making the diagnosis of cancer of the tongue at an earlier stage than is usual. In a boy 10 years old Variot ¹²⁶_{July 15, '94} observed,

on the inferior aspect of the tongue, an ulceration surrounded by a wide hardening of the tissue. After a year he saw the boy again, excised a piece of the ulcerated surface, and made a microscopical examination, which showed its epitheliomatous nature. Lagoutte¹⁰⁰_{May 29, '94} describes a case of atrophic scirrhus of the tongue, whose diagnosis, however, was made only from the clinical signs of the affection,—total hardening, with retraction and atrophy of the tongue, with superficial ulcerations and a deep, central depression, pain on pressure, otalgia, glandular swelling, and emaciation. The tumor was not operated upon on account of its slow course and of the impossibility of its complete enucleation.

Denucé¹⁸⁸_{May 18, '94} describes a case of congenital cyst on the base of the tongue, in the median line, in which tapping gave issue to a yellowish, viscid, opaque fluid containing some leucocytes, granulations, and many epithelial cylindrical cells with vibratile cilia, whose presence showed the seat of the cyst in the duct of Bochdalek (*ductus excretorius linguae*). The occlusion of this duct was probably the starting-point of the cyst.

Lingua Accessoria.—J. Herzfeld⁶⁹_{Nov. 16, '93} observed, in a woman aged 52 years, who consulted him for some discomfort in deglutition following an acute pharyngitis, a tumor on the base of the tongue, about the median line. This tumor was one centimetre long, two-thirds of a centimetre wide and the same in height. The patient stated that she was born with the tumor, which had never given her any trouble, and which had all the characteristics, functional and structural, of an accessory tongue. Müller⁶⁹_{Aug. 23, '94} showed, to the Medical Society of Hamburg, a case of *lingua accessoria*. The subject of this observation presented a tumor in the form of a fungus on the dorsal aspect of the tongue, in front of the papillæ circumvallatæ. Its surface had a normal sensitiveness to taste, and interrupted currents elicited contractions of the tumor. It was, therefore, an homologous hyperplastic tumor. Only two cases of this kind are recorded,—those of Hayem and Herzfeld.

Ankyloglossum.—Joly²⁰³_{July 1, '94} reports a case of ankylosis of the tongue in an infant a fortnight old, and who was in a very bad condition for want of nourishment, sucking being prevented by the abnormal development of the frænum of the tongue. Good results followed incision of the frænum, the child taking nourishment and gaining rapidly in weight.

Angina Ludovici.—Matignon, ²⁴³_{Apr., '94} in reporting four cases of sublingual phlegmon (*angina Ludovici*), gives an historical sketch of this disease and reviews modern knowledge as to its infectious nature, symptoms, and treatment. In all his cases he made an incision in the subhyoid region, which he thinks preferable to a buccal incision, and which was followed by complete recovery.

Periamygdalitis.—Massey ⁴⁶¹_{Jan., '94} calls attention to a new form of glossitis described by him in 1884, the seat of which is in the folliculi of the base of the tongue, and to which Seifert ¹¹⁵¹_{B.I.H.I., '93} gave the name of "acute pre-epiglottic tonsillitis." A similar form was described by Ruault ²⁸⁶_{Nov. 1, 2, '92} under the name of "lingual phlegmonous periamygdalitis." Ssimanoffsky, ²¹_{May 19, '94} speaking of inflammatory affections of the lingual tonsil, says that they are either limited to the mucous membrane or extended to the lymphatic tissue in the form of a purulent or phlegmonous inflammation (*periamygdalitis phlegmonosa*). Their causes are to be found in an infection by parasitic germs introduced with the air or foods. They are often associated with tonsillitis.

Parageusis.—Moses Kleiner ¹⁰⁹⁹_{June, '94} describes a very unusual abnormal condition of the sense of taste, consisting in a permanent condition of bad taste combined with a sense of dryness, not depending on diseases of the nose and without any trouble of the sense of smell. The female patient in whom he observed this perversion of taste had suffered from an attack of acute articular rheumatism two years before and had never fully recovered, having now and then paroxysms of severe pain in the joints. Although of a very nervous temperament, hysteria could be eliminated as an etiological factor. More probably the rheumatic diathesis was the cause of a trouble in the salivary secretion (which was glutinous, alkaline, with absence of ptyalin, and in which pus appeared), to which the bad taste was attributed. Good results were obtained from the use of the salicylates.

Salivation.—Couëtoux ³⁷_{Dec., '93} describes, under the name of "hæve," a form of chronic discharge of saliva from the mouth in infants and adults, due to mechanical disturbance of deglutition from adenoid vegetations causing nasal obstruction. This morbid phenomenon is very annoying and accompanied by frequent sneezing, dryness of the fauces, disturbed sleep, nocturnal sweatings, etc. To remove it the adenoid vegetations must be enucleated,

and if, after that, it should not disappear, frequent antiseptic gargling and irrigation and applications to the naso-pharynx must be added to subdue the inflammation of the mucous membrane by which nasal obstruction has been reproduced. Heimann¹_{Mar.31,'94} relates a case of idiopathic ptyalism overcome only by painting the entire interior of the mouth twice a day with a 1 to 1000 solution of pyoktanin for a period of three weeks, when cure was permanent..

Féré⁵_{July,'94} describes the case of an epileptic man in whom the attacks were characterized, besides the other ordinary troubles, by a copious discharge of saliva, continuing for some time after the rigidity had ceased and consciousness had been restored. Féré thinks that the anterior portion of the cerebral cortex, in the neighborhood of the centres for the movements of the face, contains a centre excitation of which causes increased secretion by the salivary glands.

Salivary Infections.—Girode¹⁴_{Jan.17,'94} examined 12 cases of salivary suppuration, of which 5 were primary and 7 developed after internal occlusion, diabetes, nephritis, pneumonia, and enteric fever. In the last cases the microbe of salivary infection had nothing to do with that of the preceding disease. In all the patients there were severe buccal lesions, as stomatitis, gingivitis, dental tartar, and signs of irritation, especially in the proximity of the openings of salivary ducts, under the form of a red, projecting tubercle, giving issue to a dense pus or to a purulent saliva charged with leucocytes and microbes. Bacteriological researches of this matter showed, in 6 cases, the staphylococcus aureus; in 1, the staphylococcus albus; in 4, the pneumococcus; and in 1 the pneumobacillus of Friedländer. Girode has been able to confirm the assertion that these micro-organisms, frequently found in the mouth, existed on the vestibular mucous membrane and in the products collected at the openings of salivary ducts. The results of this last exploration were the same as those obtained by examination of the pus taken from the gland after incision or at the autopsy. Lastly, histobacteriological examination of pieces of glands taken from less diseased parts proved the endocanalicular nature of the primary infection and its secondary extension to the interstitial tissue. All these facts are evident proofs of the ascending nature and buccal origin of salivary infections. The same

subject has been experimentally studied by Paul Claisse and Ernest Duprè, ¹⁴_{Jan. 31, '94} whose general conclusions are embodied in the following terms: Salivary infection has almost always a buccal origin and a canalicular topography. Secondary in its origin, its development depends on some general and local condition, as anatomical and functional decay of glandular parenchyma and the arrival, in this degenerated medium, of pathogenic bacteria which the anatomical and functional integrity of the gland normally prevents from gaining entrance into the great excretory channels and their more remote migration.

Salivary Calculi.—Although cases of salivary calculi are of very infrequent occurrence, still, quite a number of cases are on record. Clinton Wagner, ¹_{Nov. 11, '93} in his practice, has had only three cases, and assisted in the operation for the removal of a fourth at a clinic with which he was connected. These concretions are formed by the deposit of earthy salts (chiefly the phosphate of calcium) from the saliva in the excretory ducts leading from the gland or in the gland itself. The cause of the deposit is an obstruction to the flow of saliva either to or through the excretory duct. Calculi are most frequently found in the sublingual gland or its excretory duct,—the duct of Bartholin,—and may be recognized by a tumor under the tongue on one side or the other of the frænum; it is sensitive upon pressure, and is sometimes, but not always, fluctuating. If the body is lodged in Wharton's duct, in addition to the sublingual tumor there will be enlargement of the submaxillary gland; non-enlargement of this gland indicates that the concretion is lodged in the duct of Bartholin. The concretion is sometimes found in Stenson's duct, in which case there will be enlargement of the parotid gland. The subjective symptoms are pain and difficulty in mastication and deglutition, with more or less impairment of speech. When the parotid and submaxillary glands are inflamed from the presence of these bodies, the pain at times is agonizing. In a case of suspected calculus in a sublingual tumor, where there is fluctuation, a free incision should be made in order to give vent to the fluid contents; the calculus, if there is one, will probably be released from the duct and will escape through the opening made by the knife. If the tumor is solid and firm, a small opening should be made for the introduction of a very fine probe, with which an

exploratory examination may be made; if a calculus is felt, the incision should be freely enlarged and a small forceps introduced, with which it may be seized and removed. Wagner thinks that many of the so-called cases of ranula are caused by small calculi impacted in the duct of Bartholin. When the calculus is imbedded in the substance of the submaxillary gland, its removal is attended with great difficulty.

Diseased Teeth.—Hugh Hipple, ¹_{Sept. 23, '93} in discussing the medical aspect of diseased teeth, recalls Miller's work showing the serious constitutional effects which may and frequently do arise from diseased dental organs, not rarely resulting in death from the absorption into the system of infectious matter collected about the root of a tooth, and speaks particularly of those serious affections which result either from micro-organisms traceable to diseased teeth or from nervous irritation induced by the teeth. A tooth in which caries penetrating the pulp-cavity has caused the death of the pulp, its suppuration, and the formation of an alveolar abscess cannot but be regarded as a menace to the general health and even to the life of a patient. Encephalitis, abscesses of the brain, general infection of the blood, chronic pyæmia with the formation of metastatic abscesses, empyema of the antrum of Highmore, and perhaps many gastric disturbances are well-known after-effects of this dental lesion. Of the more uncommon infectious diseases which have been traced to the action of mouth-bacteria, and in the introduction of which into the system diseased teeth have been found to play a part, actinomycosis is one of the most interesting. This disease is caused by a ray-fungus that usually enters the body through the mouth, giving rise to granulation tumors in the jaw, lungs, breast, etc. A very interesting field for investigation, and one that has as yet been imperfectly explored, is the influence of the teeth in inducing reflex nervous disorders in other parts of the body. That there is an intimate relation between ocular disorders and pathological conditions of the teeth is conclusively shown by Brubaker.²⁰⁴⁹ Among them we may adduce amaurosis, corneal diseases, accommodative asthenopia, strabismus, ptosis, etc. Oral irritation appears to be much less frequently referred to the ear than to the eye, although in some cases aural derangements undoubtedly owe their origin or continuance to disease of the teeth. Cases of epilepsy and paralysis caused by carious teeth have been

reported. But perhaps the most common, and certainly the most painful, reflex disturbance liable to arise from diseased teeth is facial neuralgia. Given a patient with the neuralgic diathesis, and the most trivial dental lesion seems sufficient to bring on an attack of this malady.

Dunogier¹⁸⁸_{Nov. 8, '96} describes some affections of the mucous membrane of the fauces due to eruption of the wisdom-tooth. Among them relapsing and alternating or chronic amygdalitis are more frequently observed and are to be traced to the difficulty of the eruption of this tooth. Stomatitis,—simple, ulcerous, or ulceromembranous,—engorgement of lymphatic glands, etc., are more uncommon. The treatment of these affections must, of course, be directed against the cause; and as the wisdom-tooth is not always diseased and must, therefore, not always be extracted, the gum on and about the tooth is to be excised and cauterized with chromic acid and cleansed with antiseptic gargles.

Pyorrhœa Alveolaris.—This disease has been studied by Fitzgerald⁶_{Feb. 24, '94} chiefly on account of its importance to the physician. Pyorrhœa alveolaris, or Riggs's disease, is a term applied to a condition characterized by the presence of pus between the gums and the necks of the teeth, and, although usually overlooked or unrecognized by the practitioner of medicine, it is one of great importance. It gives rise not only to local troubles, but also to disturbances of the whole system, particularly of the digestive organs, because the pus, with its multitude of putrefactive organisms, may be swallowed or absorbed in the system. In the former case abnormal fermentation may be set up in the stomach-contents, and in the latter event the continual absorption of pus or its toxins into the system is now known to be a fertile source of neuritis and neurasthenia. The conditions or morbid states which are accompanied by true pyorrhœa alveolaris are gingivitis, calcic inflammation of the peridental membrane, and phagedænic pericementitis. The treatment of the former presents no difficulty. If not due to mercury or iodide a brisk purge, followed by vegetable acids, will usually do a great deal toward restoring the patient to health. At the same time an antiseptic should be used night and morning. In obstinate cases powdered sulphate of copper should be packed down under the edges of the gums with a wooden point for several days in succession, and the patient

should use the following mouth-wash: Biborate of soda, 1 drachm (4 grammes); carbolic acid, $\frac{1}{2}$ drachm (2 grammes); rose-water, to 8 ounces (250 grammes). In the treatment of calcic inflammation every vestige of tartar should be removed, peroxide-of-hydrogen solution syringed up under the gums, and antiseptic mouth-wash and suitable powder be used for a week. If the tissues are found to be turgid, thickened, and in a state of active inflammation, a 20-per-cent. solution of chloride of zinc should be applied with the syringe under the edge of the gums. If there is much destruction of tissue the following mixture should be applied with a brush to the parts every four days: Oil of cinnamon, 4 drachms (16 grammes); oil of gaultheria, 4 drachms (16 grammes); carbolic acid (crystals), 1 drachm (4 grammes). In phagedænic pericementitis all calculi should be removed, and the alveolar processes and eroded portions examined for roughness or everted margins. All eversions of the alveolar wall should be cut off, all jagged points of bone removed, and all thick edges trimmed down or broken away. In all cases, whether tartar or bone has been removed or not, the operator should wash out the cavities with a syringe, using a solution of 30-per-cent. chloride of zinc.

Dental Fistula.—Duplay ³¹_{May 17, '94} showed, in a clinical lecture, a long-standing fistula of the inferior jaw depending on caries of the root of one of the incisors, which was only recognizable by the grayish-black stains of the tooth and by the pain provoked when a probe was introduced into the fistula and carried toward the bottom of the left alveolus. Extraction of the tooth was followed by complete recovery.

DISEASES OF THE STOMACH.

Gastric Disorders as a Pathogenic Factor.—Shadburne ⁵⁶⁸_{Jan., '94} calls attention to the importance of indigestion as a pathogenic factor, starting from the well-known rule that food, improperly digested, cannot be assimilated, and becomes at once a source of starvation to the human economy, as well as a poison. Many forms of neurosis, many cases of Bright's disease, of intestinal catarrh, etc., are attributable to this long-standing alimentary poisoning. Cases of malnutrition from chronic gastro-intestinal catarrh are described by Crozer Griffith. ²³_{Feb., '94} Borgherini, ⁵⁸⁹_{Apr. 7, '94} while acknowledging the great importance of the new theory of auto-intoxication

from digestive disorders as a cause of manifold disturbances of the nervous system, thinks that this theory gives a secondary place to an element which he considers the main one, viz., organic disposition. True gastro-enteric affections do not give rise to nervous trouble except in individuals of a neuropathic temperament or suffering from a material lesion of the nervous system. Several cases are related by the author to show the exactness of his conclusions. Bond⁸¹_{Mar., '94} shows that many sexual, mental, motor, and sensory affections are oftentimes due to obscure, sometimes unsuspected, disorders of digestion and assimilation of digestive products; and that these disturbances, often dangerous, though temporarily soothed by opiates and other anodynes, require for permanent cure the thorough cleansing and restoration to normal function of the digestive tract.

Simon Eccles²_{Mar. 3, '94} regards neurasthenia as arising from disordered digestion. Of 65 cases observed by him in which neurasthenia and disorders of digestion co-existed, 19 presented signs of gastric ectasia and 17 of intestinal muscular atony. Of the remaining 29 cases, 13 suffered from diarrhœa and 16 from disorders of digestion not associated with dilatation, constipation, nor diarrhœa. Certain observations are detailed in support of the view that local abdominal disorders precede and cause neurasthenia in a large number of cases.

Gastric Auto-intoxication.—Bonardi³¹⁹_{Aug. 25, '94} relates a case of tetany following auto-intoxication from leucomaines in gastric cancer, probably developed upon a round ulcer and accompanied by gastrectasia. There was hyperacidity in the beginning, but when paroxysms set in no HCl was present in the gastric contents. Subcutaneous and intra-venous injections of the gastric contents into guinea-pigs gave rise to convulsions and flaccid palsies, and a larger dose caused death in one case. The influence of acetone or albuminoid substances could be excluded. Ferranini⁵⁸⁹_{Dec. 9, '93} describes two cases of continual gastric hypersecretion, causing numerous nervous phenomena (tetaniform convulsions, etc.) and ending in death. The fundamental cause of this "gastric tetany" is an intoxication the focus of which is the stomach. The production of the toxic substances on which it depends always indicates an augmentation of the putrefactive gastric fermentation due to diminution of the antifermentative power of the hydro-

chloric acid. Such a diminution is possible, in spite of the presence of the hyperchloridria, when HCl exists more in combination than in a free state. On the contrary, Katz¹¹³_{No.28,'93} ³¹⁹_{Feb.24,'94} believes that the theory of auto-intoxication cannot be applied to all cases, but only to a small group of acute digestive disorders; it is more probable that the symptoms may be better explained by nervous irritative conditions irradiating from the terminations of gastric nerves to the branches of the vago-sympathetic, and sustained by mechanical stimuli.

Cassaét and Bénéch¹⁸⁸_{July 29,'94} have been able to separate from the gastric contents of a patient affected by hyperchloridria a substance which, injected into rabbits, caused abolition of voluntary, but not of reflex, movements, increased rapidity of breathing, very marked hyperæsthesia, and coma. Cassaét and Féré¹⁴_{June 27,'94} had previously shown the existence, in the same conditions, of a convulsivant substance. These facts show, therefore, the possibility of experimentally reproducing, in greater part, the immediate and remote phenomena (convulsions and coma) ordinarily observed in fatal cases of gastric tetany.

Blood Alterations in Gastric Diseases.—As the outcome of his investigations, Blindemann⁵⁵¹_{No.43} ²¹_{Feb.10,'94} states that some gastric affections are accompanied by alterations in the blood. He has found that in gastric carcinoma the hæmoglobin is greatly reduced, the number of red corpuscles diminished, and the white corpuscles almost always augmented; in gastric ulcer, whilst hæmoglobin and the red corpuscles are equally reduced, the white corpuscles are not modified in number. In chronic gastric catarrh with marked ectasia no alteration is found in the blood. Such results may render the differential diagnosis easier.

Chemistry.—H. Salzer⁷⁶⁴_{Dec.,'93} examined 120 cases of gastric disease for the presence or absence of free HCl , and found among these 44 cases of anacidity,—entire absence of free HCl ,—of which only 3 were cancer and only 5 showed no pepsin nor rennet action,—that is, atrophy of the gastric tubules. Thirty-nine patients had more or less good digestion, despite the total absence of free HCl for a long time. According to his observations, decrease or absence of acidity is often identical with venous and hyperacidity with arterial hyperæmia. K. E. Wagner,⁵⁸⁶_{No.1,'94} ²_{Mar.31,'94} having examined successively 216 patients—90 men, 126 women—with

chronic gastro-intestinal affections, failed to detect any free HCl in the gastric juice in as many as 39, of whom only 6 were suffering from malignant disease of the stomach. In 12 of the 33 non-cancerous cases the secretion had either a neutral or an alkaline reaction and did not contain peptones, while in the remaining 21 the reaction was acid and the juice showed the presence of peptones. Most frequently the absence of HCl was observed in young people from 20 to 30. The author concludes that (1) the absence of free HCl in the gastric juice cannot possibly be regarded as a pathognomonic symptom of cancer of the stomach; (2) its diagnostic value is limited solely to affording an additional evidence in favor of the disease suspected on some other grounds; and (3) the absence of free HCl appears to promote the development of gastric cancer.

From their experimental investigations, Leubuscher and Schäfer³¹⁹_{Aug. 18, '94} came to the conclusion that no influence of the vagus nerve on the secretion of hydrochloric acid is demonstrable. They experimented²_{Sept. 15, '94} on rabbits and dogs to determine the effect of section of the vagi, below the recurrent laryngeal nerves, on the secretion of acid by the stomach, and found that it had no distinct effect upon this secretion. The different degree of acidity which was noted in the peripheral and central portions of the stomach-contents is best explained by the paralysis of the stomach-wall, due to the division of the vagi.

Salvioli⁴⁵¹_{May, '94} has made a series of experiments to determine the influence of fatigue upon the gastric juice and digestion, especially in animals with gastric fistulæ, and has proved that the power of digestion and the secretion of hydrochloric acid are considerably diminished after exertion. A cylinder of albumin, when introduced through the fistula into the stomach of a dog, is usually entirely digested within three hours; but if the animal be compelled to exercise vigorously, but one-half of this quantity will be digested in the same time. Similar experiments have been performed, with the same results, by Cohn and others. It is therefore evident that, in excitable or nervous patients and those with weak digestion, quiet should be insisted upon for at least one hour after the taking of food.

Experimenting by the method of Boas, A. Conti³¹⁹_{Sept. 1, '94} ascertained that in hyperacidity from simple atonic gastrectasia, or that

following cicatricial stenosis, no lactic acid is found in the gastric juice, being present only in cases of cancer. Fermentations and absence of HCl are not the only causes of lactic-acid production. Allen A. Jones ⁹_{Dec.30,'93} thinks that lactic acid arises largely from fermentation of the food, as its amount is usually proportionate to the amount of starchy, saccharine, and milk foods taken. He has, however, many times found it present in the stomach-contents two, three, or more hours after the ingestion of lean meat alone, and under such circumstances has followed the usual custom of calling it sarcolactic acid. As for its abnormal presence, it very frequently exists in large quantities in the stomach during the late hours of digestion, and is persistently present in some cases without regard to the character of the food or to the period of digestion. A very common cause of lactic-acid excess is found in impaired motility of the stomach, which allows too long retention of its contents, with the overproduction of lactic acid by fermentation. Chronic catarrhal gastritis favors the production of an excess of lactic acid; this is not the case in atrophy of the gastric glands and consequent absence of gastric juice. Of all the factors entering into the excessive production of lactic acid, none is so potent as improper diet (mixed starchy milk-puddings, pastry, sweetmeats, ice-cream, cakes and cheese, etc., after a hearty meal, and sometimes also drinking milk at or between meals, or living on milk alone). Of great importance also is the lowered general health in the establishment of a gastric state in which the overproduction of lactic acid is made easy, the functions of the stomach being, in this case, imperfectly performed, because the organ is supplied by impoverished blood, its innervation disturbed, and its muscular power weakened.

Boas ²_{Nov.4,'93} says that, according to his observations, no lactic acid occurs in any stage of healthy digestion, not even in the absence of free acid. He did not find it in chronic gastric catarrh, atony, neuroses, nor in non-malignant stricture. In twenty-one cases of gastric carcinoma (three without recognizable tumor), lactic acid was present and free hydrochloric acid absent. The importance of the presence of lactic acid is evident, since free hydrochloric acid, so often absent in cancer, is also absent in other conditions. The presence of lactic acid confirms the diagnosis, but its absence does not necessarily exclude cancer. The author hopes that by this means the diagnosis of gastric cancer may be

made earlier, and, in the absence of recognizable tumor, perhaps early enough to make total extirpation of the disease more practicable than at present.

In their experiments on the action of lactic acid on gastric chemistry, Gilbert and Dominici¹⁴_{Dec 20, '93} have found that this acid hinders the function of the stomach. Its action is the more marked the greater the dose, and when this attains 4 grammes (1 drachm) chemical function is absolutely arrested. However, its effects are but transient; and more or less slowly, according to the dose of acid, normal processes gradually set in. It appears, therefore, that lactic acid may be made useful in those cases of dyspepsia marked by hasty gastric digestion, followed by rapid discharge of the chyme in the intestine.

As the outcome of special investigation, Mester⁹_{June 9, '94} has found that under normal conditions intestinal putrefaction is induced by the action of putrefactive micro-organisms introduced into the digestive tract in large measure with food, and in a degree inversely proportionate to the activity of the hydrochloric acid of the gastric juice. It is thus increased when hydrochloric acid is diminished, and this becomes evident when meat, relatively free from putrefactive organisms, is used as food; when the proportion of hydrochloric acid in the gastric juice is normal, similar conditions of the food are without influence upon intestinal putrefaction.

Savelieff⁴_{Aug 13, '94} was never able to find acetone in the gastric contents of patients suffering from diseases of the stomach, and, without denying that it may be found under some certain circumstances, he concludes that its presence is exceedingly rare, and that examination of the gastric contents for it is of no practical value.

A. Gilbert⁵⁵_{Oct 21, '93} states that bicarbonate of sodium given with the food loses its alkalinizing effect after an hour if large doses be given, and in half an hour to three quarters if the doses are small, the acidity up to this time being diminished. The same author, with Modiano,¹¹_{July 11, '94} has found that bicarbonate of sodium, given with foods to hypopeptic patients, depresses the chemical work of the stomach in a manner the more remarkable as the dose is larger. Given an hour before meals it excites the gastric function. Such are the immediate effects of bicarbonate of soda. Its remote effects are the same when administered before or during meals; its repeated use re-excites the gastric process, diminishes

the hypopeptic condition, and creates a tendency toward normal digestion.

Foderá and Corselli³¹⁴_{Apr.15,'94} regard betol as a good agent for measuring the excito-motor power of the stomach. According to their experiments, it is not at all decomposed in the stomach and only eliminated as salicylic acid in the intestine, requiring, in a healthy man, from seventy to eighty minutes to appear in the urine. Hence a longer interval elapsing after the administration of the remedy will show a diminished motor power of the stomach. The same authors¹¹⁴⁷_{Nos.3,4,'94} found that the movements of the stomach are augmented by strychnine, nicotine, muscarine, helleborine, caffeine, quinine, electricity, massage, warmth, muscular work, and blood-letting; diminished by morphine, atropine, chloroform, chloral, cold, etc.; abolished in continual chloroform narcosis.

Gilbert and Dominici¹⁴_{Mar.21,'94} have demonstrated the antiseptic action of exclusive milk diet,—an action which is probably explained by the rapid and almost complete absorption of the milk, and by the augmented acidity of the gastric juice under its influence. In fact, Cassaét¹⁸⁸_{Dec.24,'93; Mar.12,'94} has shown that the gastric juice, when acid enough, constitutes an antiseptic medium for several micro-organisms.

Digestion.—From his experiments on the rôle of bile and Brunnerian juice on gastric digestion, Belkowski¹⁹⁷_{Feb.20,'94} draws the following conclusions: 1. The presence of a certain amount of bile does not hinder digestion. 2. Brunnerian digestion is so feeble, slow, and insignificant that it cannot play an important rôle in physiological digestion. 3. Pyloric digestion itself, which is slightly superior to Brunnerian digestion, does not compare with peptic digestion. 4. The bile exercises a less marked influence on pyloric and duodenal infusions, and not analogous to that exercised on gastric infusions. Therefore, it may be affirmed that, in a living stomach, peptonization occurring in spite of the presence of a certain amount of bile is due to the pepsin.

Linossier²¹¹_{Feb.4,'94} states that tests for the ultimate products of digestion in the stomach (peptones, sugars) are of no value whatever in estimating the activity of the gastric juice or the digestive work of the stomach, but are of importance in estimating the eliminative property of the stomach,—that is, the lesser or greater ease with which it eliminates, by resorption or by duodenal evacuation, the

products of digestion. A tendency to stasis may thus be recognized, which does not manifest itself with any of its ordinary symptoms. Examination for intermediate products of digestion (syntonins, propeptones, dextrins) have but a moderate value at the present moment, until new researches permit of a clearer understanding of their variations.

A. Dastre ⁴¹⁰_{Apr., '94} has found that fresh fibrin suspended in neutral saline solutions, such as fluoride of sodium (2 per cent.) or chloride of sodium (15 per cent.), undergoes not merely a simple solution, but a true digestion. Such observations should put physiologists on their guard against possible error in studying digestion in saline solutions.

Gilbert and Dominici ⁵⁹_{May 10, '94} have studied the number of microbes found normally in the digestive tract, computing the number per milligramme ($\frac{1}{64}$ grain) in the fecal matter of two adult men. They found in the one 67,000 microbes per milligramme, in the other 80,000. As to the relative number in different parts of the alimentary canal, experiments on dogs showed that in the stomach there were 49,000 for each cubic millimetre, and in the duodenum 29,000; from the pylorus to the cæcum the number augmented progressively, so that in the jejunum there were 100,000 for each cubic millimetre; from the cæcum to the rectum there were 30,000. Contrary to the opinion generally held, their experiments prove that the gastric juice is not mortal to microbes. Another interesting fact is the rapid decrease in the number of microbes the moment the large intestine is reached.

Nervous Disorders.—A case of so-called “anorexia nervosa” is described by Collins, ⁶_{Jan. 27, '94} in a girl, 7½ years old, who exhibited a morbid aversion to food, and who was reduced to a skeleton, with marked mental troubles; however, after some weeks of rational nursing and treatment she was restored to physical and mental health. Kissel ⁴¹_{Aug. 6, '94} describes a case of grave hysterical anorexia in a girl 11 years old.

Cases of indigestion, mainly neurotic, sometimes simulating ulcer, are recorded by W. H. Pearse. ²⁶_{Feb. 1, '94} According to Louis Wolf, ⁹⁰⁶_{Aug. 10, '94} the term “hyperæsthesia of the stomach” would be well applied to that special condition described by Leube, under the name of “nervous dyspepsia.” In the cases observed by Wolf, this disorder was exclusively functional, and not accompanied by

any discoverable anatomical lesion of the stomach; sometimes it was to be considered as an idiopathic neurosis; but more frequently it was a manifestation of a general neurosis (neurasthenia, hysteria), or of chlorosis, anaemia, and other organic or constitutional affections.

In reviewing the subject of "gastric crises," A. Laffitte¹⁰⁰_{Jan. 6, '94} says that this term must be reserved for that complex of painful phenomena of gastric origin presenting the following characteristics: Unexpected beginning, variable duration, abrupt disappearance, and integrity of digestive functions in the intervals between the crises. These are accompanied by vomiting, unconnected with ingestion of food, and repeated without any cause during a period of hours or days. Two varieties of gastric crises may be distinguished. Some are symptomatic of a medullary lesion (type: gastric crises of tabes dorsalis); others are neuropathic without known lesions (crises of hysteria, of neurasthenia, essential crises). According to Hayem¹⁴_{May 16, '94} gastric crises occur as a complication in the course of chronic gastritis of whatever variety, but are more frequently observed in hyperpeptic gastritis, because this disease affects more than any other the central nervous system.

Several cases of hyperchloridria, or Reichmann's disease, are described by de Renzi,⁵⁹⁶_{Jan., '94} who thinks that there is sometimes a connection between this form of neuropathic digestive disorder and the abuse of farinaceous foods and alcoholic drinks. De Luna⁴⁶_{Dec. 15, '93} reports the case of a lady, aged 40 years, suffering from a permanent hyperchloridria with very serious nervous disturbances assuming the form of tetany and ending in death. The total acidity of the gastric content attained 2.72.

Singultus.—Among the causes which may give rise to clonic spasms of the diaphragm (singultus), Heidenhain⁴_{June 11, '94} distinguishes direct or reflex irritation of the fibres of the phrenic nerve. The direct irritation may arise from the respiratory centres, diseases of the brain and spinal cord, or from an irritation of the peripheral portion of the phrenic nerve (from pleurisy, pericarditis, mediastinal tumors, or aneurisms); while the reflex irritation may originate in abdominal organs, and the severe form may be due to diseases of the peritoneum, the stomach, intestines, uterus, or prostate; it has also been observed in cancer of the intestines

before death. Of this last form Heidenhain describes a case in which singultus stopped only after large doses of cocaine were given. C. S. Dickinson observed a very obstinate case in which singultus lasted three days in spite of all known remedies and stopped only after taking oatmeal-porridge. The author supposed the case to be of gastric origin, due probably to irritation of the walls of the stomach, the oatmeal serving as a demulcent to the irritated mucous membrane. In treating cases of long-continued singultus, as Parsons⁷⁶⁰_{Sept. 23, '93} states, in a contribution on the subject, the removal of the cause is all-important for permanent results. In cases where the cause is from direct irritation of the phrenic, cold water, ice, acid drinks, pressure of the phrenic nerve, etc., will be of service. When the cause is of reflex origin disturbances of the different organs, from which the irritation may start, must be sought and corrected. In these cases of reflex irritation counter-irritation may succeed. Gibson, in 1886, referred to the successful removal of hiccough by the production of sneezing by tickling the nostrils. Tatevossov¹⁰⁹_{July, '91} had good results in an obstinate case from causing the patient to snuff tobacco until he began to sneeze intensely. When the symptom of hiccoughing originates from troubles of central origin, all the resources of therapeutics may be called in play before the spasm yields.

Blaschko¹¹⁶_{Aug., '94} relates a case of violent singultus which, after many useless measures had been tried, was arrested with cocaine,—4 grains (0.26 gramme) in 2 ounces (60 grammes) of water; 20 drops hourly.

Seasickness.—From his personal observations on this disease, and from a review of the literature, Winslow Warner Skinner¹_{Dec. 9, '93} comes to the following conclusions: 1. The principal symptoms of seasickness result from the lowering of the patient's arterial blood-pressure. 2. Seasickness in a person otherwise healthy and not too aged is promptly curable in the vast majority of cases. 3. The treatment consists in the hypodermatic injection of from 0.0005 to 0.001 gramme ($\frac{1}{136}$ to $\frac{1}{64}$ grain) of atropine sulphate, associated with 0.001 gramme ($\frac{1}{64}$ grain) of strychnine sulphate (or nitrate), dissolved in a cubic centimetre (15 minims) of distilled mint-water. 4. The sympathetic nervous system plays a preponderating rôle in the causation of seasickness, which ought to be regarded as a neurosis of the sympathetic. In the treatment

of this disorder chlorobrom has been used with good results by Boyd⁶_{Dec. 23, '93} and Charteris.⁶¹_{Dec. 23, '93}

Hysterical Vomiting.—J. R. Wallace²³⁹_{Oct. 16, '93} observed a case of strange diurnal vomiting for two years without apparent cause and without ill results. The patient, a stout, plethoric lady, aged 45, was clearly approaching her climacteric and had begun to be somewhat hysterical and to suffer with dyspeptic symptoms and vomiting, which occurred daily between 4 and 5 P.M., without pain or distinct nausea or other effort at emesis except a single act of expulsion, causing the ejection of the contents of the stomach. The vomited matter was of a brown color, of the consistency and appearance of coffee-grounds, and, examined under the microscope, showed no morbid cell-products. No form of treatment, either dietetic or medicinal, seemed to check the vomiting or alter the quality of the vomited matter.

T. Egappa¹⁰⁹²_{Nov., '93} describes the case of a strong, plethoric, Indian female, of a neurotic family and herself extremely nervous, who began to suffer with symptoms of dyspepsia and especially of nocturnal vomiting, of which she was cured by a fortuitous accident which strongly impressed her. A case of severe hysterical vomiting is related by H. N. Rucker.⁶¹_{July 28, '94} The vomiting was so frequent that but little sleep was obtained, and finally death took place. At the autopsy a careful examination of the abdominal viscera revealed nothing to account for the severity of the symptoms. The stomach was slightly enlarged and its walls somewhat attenuated.

Rumination.—Singer,²_{Sept. 30, '93} in relating four cases of rumination in man, says that the inconstancy in the chemical processes in the stomach is in favor of the nervous origin of the disease, and that this origin is further confirmed by its relatively-frequent occurrence in the insane, by the fact that it may at times be voluntarily suppressed or even produced, and that it has sometimes been called forth by imitation. The neuropathic constitution forms the remote cause, and this leads to rumination in the predisposed by more proximate causes (deficient closure of the cardia, etc.). From long and careful observation of a case of merycism in a male, and from a study of the literature of the subject, Lemoine and Lins-sier⁹_{May 5, '94} conclude that this condition should be considered as presenting two varieties,—a simple and a pathological form; while

the latter includes three subvarieties,—a neuropathic form, with or without dyspepsia ; a form of dyspeptic origin and directly related to dyspepsia ; and a form of dyspeptic origin, but not disappearing with the relief of the dyspepsia. The condition must be considered as a gastric neurosis. The act of regurgitation is a reflex phenomenon the starting-point of which is a congenital or acquired exaggerated sensibility of the mucous membrane of the stomach. Bruner⁵⁷_{June 10, '94} states that regurgitation and rumination are intimately allied, and that both have generally a nervous origin. However, he has observed a case in which regurgitation preceded the manifestation of a tumor of the stomach. In the case described by Hammond,¹_{July 28, '94} rapid eating always caused the food to be brought up more promptly than when time was taken to eat deliberately. As a rule, the patient whose mental condition approached imbecility ate with scarcely any mastication, and undoubtedly this bad habit was the cause of the affection. Hammond is inclined to believe that the greater comparative frequency of mercurism in subjects with mental deficiency is due to the fact that they are prone to eat without sufficiently chewing their food and to swallow one mouthful before the preceding one has reached the stomach. In this way the œsophagus is inordinately distended and regurgitation most apt to occur. The author suggests that perhaps there is in the brain of man a regurgitating centre,—the relic of that which was active in a former state of human development,—rudimentary, dead, but which, as is occasionally seen in other analogous conditions, under favorable influence starts into activity. At any rate, mercurism would appear to be due, in some cases, to an effort of nature to secure proper mastication of food.

Diagnosis.—S. Solis-Cohen,¹⁴⁴_{Jan., '94} having experimented with Einhorn's gastrodiaaphane, states that the advantage of this method consists in determining the presence or absence of thickening in the anterior wall of the stomach and in determining the exact position of the stomach and the outline of the lesser curvature. The instrument is exceedingly useful in diagnosing between dilatation of the stomach and the condition termed "gastroptosis" or sinking of the stomach.

Ratjen⁶⁹_{Aug. 23, '94} demonstrated, at a meeting of the Hamburg Medical Society, the technique of electrical transillumination of the stomach, and emphasized its diagnostic value in showing enlarge-

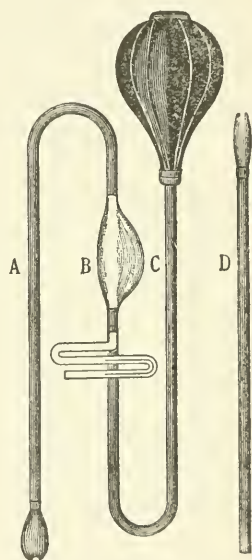
ments, adhesions, and lessening of volume retractions of the stomach and tumors developed on its anterior wall.

A new apparatus for obtaining the contents of the stomach for diagnostic purposes has been devised by M. Gross.¹_{Nov. 13, '93} It is divided into three parts,—a stomach part, a middle part, and an end piece. The stomach part (*A*) consists of a long, thin Nélaton catheter with one opening at its proximal extremity, or it may simply possess an olive-shaped end, the latter of which the author prefers, inasmuch as it may the more readily be swallowed. The middle piece (*B*) represents an eccentric glass bulb for collecting the stomach-contents, and connected with the bulb of a manometer for determining the change of pressure in the tube. The end piece (*C*) of the tube is made up of a modified Politzer bag, or it may consist simply of a mouth-piece (*D*), in which case the physician himself aspirates. With the introduction of this small and soft stomach-tube the author has succeeded in reducing to a minimum the choking and vomiting sensations which the patient endures on the introduction of the common stomach-tube.

Gastritis. — Pilliet⁷_{No. 22, '93}; ¹⁴_{Dec. 13, '93, Jan. 17, '94} has studied the lesions produced in the stomach by experimental ingestion of several caustics (sulphuric acid, croton-oil, essences) and has found them to exactly resemble those of phlegmonous gastritis in man, the only difference being that the infiltrations are more hæmorrhagic and less purulent and do not contain micro-organisms.

Putrefactive processes have often been accused of producing chronic gastritis, and Hildebrandt²⁶_{May 1, '94} shows the justice of the charge in many instances, giving 200 cases of chronic gastritis and gastrectasia connected with blennorrhœa retronasalis, and calling attention to the fact that the secretion of ozæna produces the most injurious results.

E. T. Flynn²_{Feb. 3, '94} relates the case of a neurotic woman, aged



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37, suffering from dyspepsia for ten years, which vanished when she was pregnant and came again in the intervals. In July, 1893, she vomited blood for the first time (slight streaks) and suffered great pain after eating; she was then confined to bed for several weeks, but afterward resumed her usual household duties, still suffering from dyspepsia and obstinate constipation. On November 25th she took a strong Seidlitz powder, which had no effect, and which was followed by violent pain in the abdomen. Symptoms of perforative peritonitis set in, which in a few hours ended in death. No post-mortem examination was allowed.

Plastic Linitis.—Bret and Paviot,⁹²_{May 10, '94} having studied the so-called Brinton's "plastic linitis" in three cases, in which an histological examination was made, came to the conclusion that this form of disease cannot be considered as a gastritis, but as a cancerous infiltration of the gastric walls, which may give rise to secondary lesions of the same nature in the peritoneum, less frequently in the intestinal walls, and exceptionally in more remote organs.

Dilatation.—Boas⁶⁹_{Feb. 22, '94} records the case of a gymnast, aged 20, who, after dietetic errors, had an attack of acute dyspepsia, attended with diarrhœa, vomiting of large quantities of sour material, followed by great thirst and constipation. Examination showed extensive insufficiency and dilatation of the stomach. A considerable amount of H_2S and free HCl slightly in excess were present in the gastric contents. By regular lavage of the stomach and a strict diet the condition improved, but the stomach was not altogether restored to health. This case shows the importance of a rational treatment even in so harmless an affection as acute dyspepsia usually is. An emetic would here have prevented the gastric dilatation. A somewhat similar case is described by Armstrong Todd.²_{Mar. 10, '94}

Riegel⁶⁹_{Apr. 12, '94} draws attention to the fact that, in order to form an exact diagnosis in gastric disorders, all methods of examination, including that of gastric chemistry, should be used. He relates a case in which the chemical and motor functions of the stomach were absolutely normal, but physical examination and inflation with gas showed a very large stomach (megalogastria), which was to be considered as an anatomical rather than a pathological condition. Cases of gastric dilatation may be divided as follows: increased size with deficient motor power,—the so-called atonic

dilatation (gastrectasia); increased size without change in the motor power (megalogastria).

Aufrecht ¹⁴⁷_{Aug., '94} directs attention to two new signs of dilatation of the stomach, obtained by percussion. In percussing a stomach which has commenced to dilate, by means of a pleximeter, a dullness, more or less complete, is obtained at certain points in the gastric region, instead of the usual tympanitic tone. If the pleximeter is kept at the point of dullness and feeble percussion is made, after waiting a few seconds the dullness will be found to have been replaced by a tympanitic tone. This phenomenon is explained by contraction of the walls of the stomach on account of the hypertrophied muscular coat, which is constantly present in gastrectasis. The second sign is a cracked-pot sound (*bruit de pot fêlé*), which is obtained in the immediate vicinity of the dullness already described.

Several cases of dilatation of the stomach have been described, with but little of interest. In that of de Renzi ⁵⁶⁹_{June, '94} a round ulcer had preceded, and the stomach, according to the results of physical examination, had taken the form of an hour-glass. In the case of Young ⁶_{Aug. 18, '94} the stomach occupied nearly the whole of the anterior part of the abdomen and the diaphragm was slightly displaced upward. Tweedy ²_{Jan. 20, '94} observed a case of great dilatation of the stomach with enteroptosis. Veeder ²_{Feb. 3, '94} made a post-mortem examination in a case of gastric dilatation in which sudden death followed a hearty dinner.

Dyspepsia.—G. Sée ¹⁵²_{No. 62, '93} claims that a third of the patients thought to be dyspeptic are actually sufferers from intestinal disease. This is especially true of women, for a careful examination, both by physical and chemical diagnostic measures, reveals good gastric function and no dilatation. The whole trouble lies in the intestine, and pre-eminently in the large intestine. The small intestine, in such cases, is healthy. The condition deserves the name of muco-membranous enteritis, and is characterized by disturbances in the functions of the colon, gaseous fermentation, and dilatation of this intestine. Nothing reveals the diagnosis with more certainty than the passage of mucous, glairy, ribbon-shaped or cylindrical masses in which the feces are often hidden. These mucous products are also frequently accompanied by the hardened residua of undigested food. Treatment consists in evacuation by

mechanical means (olive-oil or senna), calming the pains by bromide of calcium or strontium or cannabis Indica, limiting fermentation and formation of gas by the phosphate, baborate, or salicylate of sodium, etc.

According to Plicque, ⁷³_{Feb. 3, '94} *false dyspepsia* may depend on (1) disorders of other parts of the digestive apparatus than stomach, and especially of the mouth, intestine, and liver; (2) lesions of the genito-urinary organs; (3) different troubles of the nervous system. *Artificial dyspepsia* is produced by coarse hygienic and dietetic faults, by alimentary or medicinal poisoning of different kinds, and by professional, accidental, or criminal poisoning.

Gastro-enteric Rheumatism.—This is the name given by H. M. Lyman ⁵_{June, '94} to certain disorders of the nervous and glandular apparatus of the alimentary canal, constituting a distinct and definite form of rheumatism, just as rheumatic tonsillitis is a definitely-localized manifestation of arthritic disease in the fauces. The main feature of this particular form is represented by painful paroxysms, experienced when the stomach is nearly or quite empty, several hours after taking food. The location of the pain is generally abdominal, usually occupying the epigastrium or the hypochondrium. It is a dull, deep-seated, widely-diffused, and persistent distress, quite different from the pain of ordinary gastralgia, hepatalgia, renal or intestinal colic, or peritonitis. In short, it possesses all the characteristics of neuralgia, affecting the ganglionic nervous system rather than the cerebro-spinal nerves of the body. It exhibits a marked tendency to alternation with the neuralgias and myalgias that occur in other nerve-territories. During the intervals between the paroxysms, especially if food and sleep have been procured, bodily comfort may be complete; but the close of gastric digestion, or the occurrence of bodily fatigue, or an exposure to cold, damp air may be immediately followed by a return of pain. At first the general health does not appear to be appreciably affected, but after awhile loss of sleep, loss of appetite, and persistent malassimilation produce a condition of exhaustion. The pathology of the disease still remains as unsatisfactory as that of rheumatism in general. It seems probable that the symptoms are the result of toxic influences affecting the tissues as a consequence of hepatic and renal insufficiency. The discovery that when this form of rheumatic pain affects the gastric plexus there is present

an excess of free HCl in the gastric juice suggests the thought that here is a condition of the organ analogous to that of an over-taxed muscle that is painful after fatigue.

Hypersecretion.—Westphalen²¹_{Jan. 6, '94} thinks that hypersecretion of the stomach is sometimes an independent disease, without any nervous disposition or actual troubles, inasmuch as it may be permanently cured only by local treatment (stomach-washing with nitrate of silver 1 to 1000).

Flatulence.—Bardet,¹⁴_{Feb. 25, '94} speaking of the origin of flatulence, which is one of the most distressing symptoms encountered in dyspeptics, admits that a small quantity of hydrogen may be sometimes yielded by food-fermentation, but that such a process would be quite incapable of generating, in the space of an hour (as he has often observed), forty or fifty litres (quarts) of a gas four-fifths of which were made up of hydrogen. He has carefully analyzed the gaseous contents of the stomach of a man the subject of flatulence. These were found to be composed of from 75 to 90 per cent. of CO₂ and no H, the residue consisting of air and an excess of O. He therefore concludes that, in the case of attacks of flatulence with abundant and odorless eructations, fermentation plays no rôle whatever, the gases being yielded by the blood. Dujardin-Beaumetz¹⁴_{Mar. 18, '94} regards flatulence as a nerve-trouble, and adds that warm liquids provoke stomach-contractions, and hence aid in expelling any gases contained in that viscus. He says that one should never sleep on the left side; for then the food in the stomach sinks into the large *cul-de-sac*, interfering with the passage of the chyme into the pylorus.

Enteroptosis.—C. Meinert,⁸⁵⁵_{Sept., '93} as the result of numerous clinical and anatomical observations, states that displacement of the abdominal viscera is very frequent in women and less frequent in men. Every organ below the diaphragm, and even the diaphragm itself, may be involved, the part most frequently affected being the colon, next the stomach. The colon alone may be prolapsed. In case a single abdominal organ is found prolapsed, the condition can generally be diagnosed. These cases may be unhesitatingly pronounced pathological. To this class belong especially cases in which gastropptosis and coloptosis occur coincidently. A case of gastropptosis is described by Homer and Schauman.⁴⁹⁸_{Nov. 11, '93} ⁹⁹⁶_{Jan. 25, '94} A young lady, suffering from her infancy from gastric troubles

believed to be of nervous origin, was seized, in her 29th year, with severe symptoms of dyspepsia, general nervous disorder, and rapid emaciation. The stomach was then carefully examined and, by means of inflation, was found to be remarkably lowered, its superior border being at 5 and 3.5 centimetres, respectively, above the umbilicus, and the inferior at 8 and 9 below; its transverse diameter measured 16 centimetres. The motor functions of the stomach were normal. There was some free HCl in its contents after an Ewald-Leube meal. No displacement of the other abdominal organs was demonstrable.

Gastric Ulcer.—F. Kinsman Smith²²²_{Mar., '94} finds that, while the usually-accepted theories (autodigestion of the stomach-wall following an interference with the circulation over a limited area, from direct or indirect traumatism or irritation, etc.) explain sufficiently and in a fairly-satisfactory manner the origin of gastric ulcer in a certain number of cases, they do not satisfactorily explain the remainder,—a considerable portion of the whole number,—and in which the agency of infective organisms, in opposing the recuperative effects of nature, may probably be admitted. This opinion is supported by experiments of many investigators, in which gastric ulceration was induced by the intra-vascular, intra-peritoneal, and intra-gastric injections of pus, staphylococci, and bacilli, and by recent ones of Hallion and Enriquez,⁵⁹_{Feb. 3, '94} who found that, when pure cultures or the toxins of the diphtheritic microbe were injected subcutaneously, the gastric mucous membrane was found, post-mortem, to be covered with ecchymoses, while the submucous coat of the stomach presented considerable congestion, beneath which ecchymoses appeared in the mucous membrane itself.

Gilles de la Tourette,¹⁴_{June 10, '94} from cases collected in the hospitals of Paris, concludes that alcoholism is the main etiological factor in gastric ulcer; next comes hysteria, which is capable of producing in the stomach some trophic troubles analogous to cutaneous ulcerations.

Among the numerous cases of gastric ulcer described, the following may be mentioned as presenting interesting features: that of Thomas Whipham,⁶_{Dec. 30, '93} in which an ulceration of the stomach was complicated by pleuro-pneumonia and ended in death; that of Blake,⁶⁹_{Nov. 30, '93} a young lady who, ten days after having accidentally swallowed a piece of toasted crust, was unexpectedly taken with

hæmorrhage and died in a few hours; that of Fortescue Webb,²_{Feb. 17, '94} in which a female patient, having never had any occasion to consult a medical man, complained suddenly one afternoon of pain all over the abdomen, and next morning was discovered dead in bed (on post-mortem examination an ulcerated perforation was found on the anterior surface of the stomach); that of Tapie,¹⁰⁸⁸_{Apr. 22, '94} in which a gastric ulcer developed after a severe shock; that of Potain,⁴⁵¹_{Oct., '93} which probably had a similar, but more remote, traumatic origin; that of Netter,¹⁴_{July 8, '94} in which an old hydatid cyst of the liver (as found at the autopsy) had probably given rise to an ulcer of the stomach by compression of the gastric coronary artery; that of Roux,¹⁹⁷_{Nov. 20, '93} of perforation of the anterior wall of the stomach by a round ulcer, which was operated upon by incision and suturing and healed rapidly. In a case of a gastric ulcer, in which probably the healed cicatrix of an old ulcer had partly broken down and caused a renewal of symptoms, J. Porter Parkinson,⁶_{Jan. 27, '94} found that free hydrochloric acid was absent from the vomited matters.

Cancer.—Cases have been reported by Donnadien and Demptos,¹⁸⁸_{Jan. 28, '94} of carcinoma of the whole pyloric region; Lépine,⁶⁹_{Mar. 29, '94} gastric cancer accompanied by very great glandular enlargement in the left supraclavicular region; Buchanan,²¹³_{Nov., '93} colloid cancer of the stomach with extensive infiltration of the mucous membrane of the stomach and duodenum by the new growth; Coyne,¹⁸⁸_{Mar. 4, '94} primary cancer of the stomach and gall-bladder in the same patient; Summa,⁸²_{May 19, '94} “ulcus carcinomatosum” of the stomach accompanied by metastatic cancer of the liver; Sydney Jamieson,²⁶⁷_{Mar. 15, '94} carcinoma ventriculi with gastrocolic fistula, secondary abscess between the greater curvature of the stomach, transverse colon, and ante-abdominal wall; Leopold Lévi,⁷_{No. 3, '94} cancer of the pyloric region of the stomach and of the head of the pancreas; Buchanan,²¹³_{Nov., '93} colloid cancer of the stomach with extensive infiltration of the mucous membrane of stomach and duodenum by the new growth; Bernard,⁷_{No. 1, '94} cancer of the stomach developing along the curvatures, invading, along the lymphatic channels, the receptaculum chyli, thoracic duct, and mediastinal ganglia, there being no subclavicular ganglia; S. W. S. Toms,¹_{Aug. 4, '94} carcinoma ventriculi with three perforations in the posterior wall, and preceding gastric ulcer; Macé,⁷_{No. 9, '94} cancer of the pyloric portion of

the stomach, with secondary involvement of the liver, lungs, and mesenterium.

As a reliable symptom for early diagnosis of cancer, in a great number of cases, and especially in cancer of the stomach, Bogdan²²³_{No.1,'94} indicates a patch of crimson on each cheek, formed by the dilatation of superficial veins and showing out sharply against the pale yellow of the surrounding skin. On the strength of this symptom alone he was able to make a diagnosis of probable cancer at a time when there was no other manifest sign of that affection.

In reporting a case in which cancer of the stomach developed on a round ulcer, Robert Koch²¹_{May 24,'94} describes the symptoms of this form of cancer and calls attention to the fact that free hydrochloric acid is present in the gastric contents for a longer time than in other cancers and can be found up to a few days before death.

Hanot⁹⁹⁶_{Dec.10,'93} has shown that in some cases of gastric cancer there is not only anorexia, but the appetite may be exaggerated up to the degree of boulimia, or it may be replaced by a false appetite. A differential diagnosis cannot therefore be based on such a sign as the appetite, which may show the paradoxical modification of hysterical anorexia when the stomach is almost or altogether healthy, and of cancerous boulimia when it is seriously affected.

Cohnheim²_{June 16,'94} contends that it is possible to make a fairly certain diagnosis of gastric carcinoma in the absence of a tumor. In cases of carcinoma an intense reaction to Uffelmann's test for lactic acid appears. For such reaction stagnation of the gastric contents and permanent absence of free hydrochloric acid are necessary. Within eleven months ten cases were seen without recognizable tumor, in all of which a positive reaction with Uffelmann's test was obtained, and at post-mortem examination, some months later, gastric carcinoma was found present. No such reaction was ever observed in cases of gastrectasis or of chronic gastritis with absence of free hydrochloric acid. The author lays stress on the importance of early diagnosis as bearing on the question of possible removal.

Ferrier²²_{May 30,'94} calls attention to the fact that in many cases purely inflammatory lesions may simulate cancer. A woman entered the hospital with gastric troubles presenting all the symp-

toms of cancer and coinciding with the existence of an epigastric tumor. Ferrier performed laparotomy for exploratory purposes and found the stomach adherent to the walls of the abdomen and to the left lobe of the liver. After breaking down the adhesions he closed the wound and the patient gradually lost all bad symptoms and left the hospital quite recovered. In such conditions an exploratory operation would serve to put the case in its true basis and would do no harm to the patient.

Sarcoma.—Westphalen²¹_{No. 45, '93} reports the case of a man, 28 years old, who, for about a year, had complained of intense epigastric pain, vomiting of mucus and acid liquid, and dyspepsia. There was a history of previous alcoholic excess, gonorrhœa, and syphilis. The patient had lost 70 pounds (32 kilogrammes) in weight in a year; nutrition, nevertheless, appeared fairly-well preserved, and anæmia was not conspicuous. Upon palpation a sense of resistance was appreciated to the left of the median line; the dullness elicited upon percussion was lost in that of the liver, but was separable from that of the spleen. Investigation disclosed a condition of gastropsis; gastric motility and absorption were somewhat tardy; the acidity of the gastric secretion was diminished, hydrochloric acid ultimately disappearing. The diagnosis remained doubtful until, on one occasion when the gastric contents were ejected an hour after the ingestion of a glass of ice-water, a bit of tissue was found which, on microscopical examination, displayed the histological appearances of a round-celled sarcoma. Operation was advised and undertaken, but the growth proved to be too extensive to permit of its removal. The patient lived for a month longer. Microscopical examination of the thickened wall of the stomach demonstrated the neoplastic formations to be of the nature of myxosarcoma.

Traumatic Cyst.—Ziegler³⁴_{Feb. 6, '94} relates the case of a man who received a severe injury in the region of the stomach and some weeks later showed the physical signs of a tumor between the umbilicus and the left hypochondrium. It was impossible to make the differential diagnosis between an encapsuled blood-effusion into the peritoneal cavity, rupture of the stomach or intestine with consequent adhesions, pancreatic cyst, cyst of omentum, mesentery, liver, spleen, kidney, etc. Five months after the injury the abdomen was opened, when a large cyst, covered with peritoneum,

occupying the anterior stomach-wall, was emptied and the patient recovered quite rapidly. Ziegler supposes that an extravasation of lymph mixed with blood was the starting-point of the cystic formation.

Tuberculosis.—Przewoski, ^{July 15, '94} attributes the origin of gastric tuberculosis to the local action of expectoration swallowed by phthisical patients. As predisposing causes are to be considered (1) chronic gastritis with diminished acidity of the gastric juice; (2) a great number of lymphatic nodules in the pyloric and cardiac region of the stomach; (3) the continued presence of expectoration in the stomach; (4) accidental erosions of the gastric mucous membrane. Tubercular ulcers of the stomach are distinguished from those of the intestines by the fact that they involve mainly the submucous layer, very rarely extend to the muscular or peritoneal layers, and contain a lesser number of tubercle bacilli.

Therapeutics.—Rosenheim, ^{June 9, '94} in reviewing a number of new methods of treating diseases of the stomach and intestines, first discusses the stomach-douche. He uses a tube with numerous side-openings and one large terminal opening. Under pressure the water issues from all these orifices, and in this way all parts of the stomach are acted upon. The douche is used morning and evening. By this method syringing with force against the stomach-wall is avoided; and, by using the douche when the stomach is empty, matters serving for nutrition are not abstracted. The douching is more easily done by the patient, and the tube does not become blocked. Besides warm douches, which are sedative and but slightly stimulating, water containing common salt, chloroform, or silver nitrate (1 in 1000) may be used. The douche is useful in nervous dyspepsia, chronic gastric catarrh of moderate severity, and in severe affections of the sensory and secreting apparatus of the stomach, as gastralgia and hypersecretion. The addition of sodium chloride to the fluid is said by the author to increase the HCl production and that of silver nitrate to diminish it. After the stomach is washed out once or twice the silver solution is run in and allowed to remain half a minute. As regards the electrical current the exact indication as to the kind is still in doubt. In motor insufficiency its value is unquestionable. The author thinks it also allays symptoms of sensory irritation. Here the negative pole should be placed in the stomach. As regards

the treatment of gastric ulcer he has obtained good results with large doses of bismuth—10 grammes ($2\frac{1}{2}$ drachms) of bismuth sub-nitrate in 200 grammes (7 ounces) of water—in the morning on an empty stomach, 50 grammes ($1\frac{2}{3}$ ounces) of water being taken a little later.

According to A. W. Perry ⁶¹_{July 23, '94} the use of the stomach-tube for emptying and washing out the stomach gives better and quicker results than any other in acute and chronic gastric catarrh, so-called bilious attacks, cancer of the stomach, obstinate hiccough, persistent vomiting, various fermentations in the stomach, and dilatation. Attacks of acute gastric catarrh are shortened from one to four days to a few hours by lavage of the stomach. Chronic gastric catarrh yields in a few weeks to lavage, while it is almost incurable otherwise. Obstinate hiccough, threatening death by exhaustion, is cured immediately. The various fermentations in the stomach causing severe headache, epigastric and intercostal pains, lumbago, and ecthyma are promptly relieved and usually soon cured. Dilatation not depending on pyloric stricture is usually the result of fermentation; occasionally after a severe acute disease it may be a cause of fermentation. It is only curable by the use of the tube. In cancer, lavage two or three times weekly gives great relief.

As a result of a systematic study of the subject, Cantru ⁸¹⁴_{Apr. 15, '94} states that massage is indicated in all chemical types of dyspepsia, but especially when digestion is accomplished too slowly, as ascertained by examination of the chemical phenomena of stomachic activity. Superficial sedative massage is to be employed in all cases when there is intense pain; superficial or deep, excitant massage when the evacuation of the contents of the stomach is delayed and there is a more or less pronounced dilatation; deep, sedative massage when contracture of the pyloric orifice is suspected. When an organic lesion of any kind exists, such as ulcer or cancer, or when the digestive process is unduly accelerated, massage is entirely contra-indicated.

Carselli ¹⁵_{Aug., '94} prescribes in acute gastric catarrh: Bromide of strontium, 30 grains (2 grammes); syrup of orange, 1 ounce (31 grammes); distilled water, to make 4 ounces (124 grammes). To be taken three or four times daily, before and after food. Bromide of strontium acts in two ways,—as a sedative to the nerves

of the stomach and as an antiseptic. Matthes³¹⁹_{Jan. 6, '94} has investigated, both experimentally and clinically, Fleiner's method of treating irritative diseases of the stomach with large doses of bismuth, and has found the method very successful, especially in lessening pain. He thinks, therefore, that massive doses of bismuth are of use in some dyspepsias, and especially in gastric ulcer.

Cantú,⁵⁹_{Apr. 21, '94} having had occasion to give duboisine as a calmate of gastro-intestinal pains, was led to a study of the physiological action of this drug upon the gastric functions, and found that it caused a marked diminution in the acidity of the gastric contents, reducing it about one-half, chiefly the secretion of hydrochloric acid. Duboisine would therefore be indicated in all gastric affections characterized by an exaggerated glandular secretion or, rather, by an increased formation of HCl. The excellent results obtained by the author from the administration of the drug in several cases was a practical confirmation of his experimental conclusions. The dose of the hydrochlorate employed was 0.0002 to 0.0004 gramme ($\frac{1}{32}$ to $\frac{1}{16}$ grain) hypodermatically or 0.0002 to 0.0007 gramme ($\frac{1}{32}$ to $\frac{1}{9}$ grain) by the mouth.

Fraser⁵⁹_{Apr. 21, '94} has for many years treated, with bichromate of potassium, catarrh of the stomach, chronic gastric ulcer, gastrodynia, and even dilatation and malignant disease. In the two latter some of the symptoms were occasionally relieved and in the others were, as a rule, entirely removed. Bichromate of potassium appears to exert a beneficial and curative influence not only by reason of its antifermentative action, but more conspicuously by virtue of a direct or indirect analgesic effect. It is probable, also, that certain histological structures in the stomach-wall are selectively modified by it. The doses employed by the author were from $\frac{1}{12}$ to $\frac{1}{6}$ grain (0.005 to 0.01 gramme), given thrice daily, one or half an hour before eating.

Einhorn¹¹⁴_{B. 23, H. 3, 4, '93} has treated forty-two patients, suffering with various diseases of the stomach, by means of direct electrization of the stomach, and concludes that faradization is most useful in dilatation and atonic conditions of the pylorus and cardia, as well as in chronic glandular gastritis, and that galvanization is an almost sovereign remedy against gastralgia of a nervous origin or due to ulcer, and has a beneficial effect on many heart affections dependent on gastralgia.

The same author ⁵⁹_{June 23, '94} has constructed for the local treatment of gastric ulcer (and recommends its use generally in the field of diseases of the stomach) a gastric spray-apparatus, which is used in the following way: First, the stomach, in a fasting condition, is washed out with lukewarm water; when all the water has been emptied, the tube is removed from the stomach. The spray-apparatus is filled with 10 cubic centimetres ($2\frac{1}{2}$ fluidrachms) of a 1- to 2-per-1000 solution of nitrate of silver, the tube-end dipped into warm water and inserted into the stomach (length of tubing fifty centimetres); the whole or the greater part of the solution in the bottle is then sprayed into the stomach, the bottle opened, and the spray-tube removed.

J. B. Marvin, ²²⁴_{July 28, '94} discussing the management of so-called dyspepsia, says that in the majority of cases of gastric trouble the best results are obtained from the mercurials. Cases of biliousness, so called, which are nearly always dependent upon indigestion, are benefited more markedly by either small doses of calomel, or calomel and ipecac, or the old-fashioned blue pills. In other cases, where some mild cathartic action is required, salines in hot water before meals, washing out the stomach, and emptying the bowels are preferable. In nervous and hysterical women the best results can be obtained by putting them to bed, and getting them to sleep twenty-four or even thirty hours; another important point in the treatment of these cases is isolation. In cases where there is a deficiency in secretion Marvin gives muriatic acid in large doses according to Ewald's method. When hyperæsthesia and other neurotic symptoms are present, bromide of ammonium renders the best service in 5- or 10-grain (0.32 to 0.65 gramme) doses.

Austin Flint ¹_{Oct. 14, '93} remarks that the discomfort and distress sometimes observed soon after taking food in dyspepsia are probably not due to deficiency of pepsin, but rather to the undue formation of gases,—by fermentative processes going on under the action of organized ferments. It is seldom that undue fermentation in the alimentary mass begins in the intestinal canal; it usually occurs first in the stomach and is continued in the small intestine; in the exceptional cases in which its origin is intestinal there is usually a deficiency of bile. In cases of functional dyspepsia with flatulence Flint has used with most success the subgallate of bismuth (5 grains—0.32 gramme—either before or after

each meal), which, according to his experience, acts almost as a specific in these forms. During this treatment patients are simply directed to avoid excesses in food and drink and to eat little or no pastry or sweets.

In the treatment of dyspepsia, either irritative or atonic, Dujardin-Beaumetz ⁸⁷⁹_{Jan., '94} regards proper attention to nourishment as of paramount importance. Such patients should greatly reduce the quantity of meat and confine themselves to eggs, farinaceous foods, green vegetables, and fruits, and as drink take only milk or an alkaline (no gaseous) water, with a little white wine. As regards remedies, intestinal antiseptics (salol, salicylate of bismuth, benzo-naphthol) are the best. When intestinal putrefaction is most intense, rectal irrigations must be resorted to with a litre (quart) of water to which 0.1 gramme ($1\frac{3}{4}$ grains) of β -naphthol is added.

Wegele ²_{May 26, '94} says that the severer form of atonic gastric dilatation must be treated by washing out the stomach in order to free it of very acid and fermenting contents; but, as a considerable amount of nourishment is thus withdrawn, rectal alimentation must in addition be resorted to, either water alone or desirable foods being used. The diet must be suited to the condition of the gastric chemistry. If hyperacidity exist, large doses of alkalies are indicated. If fermentation is present, harmless antiseptics should be added to the water for washing, and salicylic acid, creasote, and bismuth salicylate given internally. If the abdominal walls are lax, a belt should be used. In an address on dilatation of the stomach, Broadbent, ²_{Dec. 2, '93} after discussing the causes, symptoms, and diagnosis of this disease, deals largely with its treatment. Diet must be regulated according to the origin of the case; in dilatation produced by overfeeding or improper food, an extremely strict and meagre diet for a few days will be the best starting-point for treatment; no advantage would, however, result from a low diet in cases of neurotic origin, for which a careful study of the patient's idiosyncrasies will be required and the diet adjusted accordingly. An expedient often of great service is the drinking of hot water, especially in the prevention of sleeplessness and nocturnal asthma. In the use of drugs two principal objects are to be kept in view,—to rectify the chemical processes taking place in the stomach and to promote the contractile energy of the muscular

walls; antiseptics and tonics, therefore, are to be used. When there is pain after food, it may be necessary to give bismuth and magnesia, or soda with perhaps a small dose of opium, before meals; when there is heart-burn, carbonate of sodium or other alkalies; when, again, there is flatulent distension, carminatives may be required. When a tonic of the nervous system is indicated, $\frac{1}{24}$ to $\frac{1}{18}$ grain (0.0027 to 0.0035 gramme) of arsenious acid may be included in one of the several antiseptic tonic combinations. Washing out the stomach is a great resource in cases where the patient does not recover under the above treatment.

From his experience in several cases, William Cayley<sup>1077
May 30, '94</sup> urges the extreme importance of the early treatment of gastric ulcers due to corrosion by the gastric juice. If treated early they readily heal; if left to become chronic in many cases they become incurable. Care must be taken to prevent the ulceration from being irritated. Emanuel Senn advocates the use of olive-oil as a remedy in the treatment of gastric ulcer. The advantages of giving a lubricating medium are that friction decreases, contact is prevented with the irritating effects of the abnormal gastric juice, and coagulation of blood in the stomach is favored and facilitated. He gives it in large doses at short intervals, in order to keep a continuous film over the diseased mucous membrane and to protect it from the corroding effects of the morbid secretion. Brilliant results have thus been attained in recent cases. Stepp<sup>116
Nov., '93</sup> writes enthusiastically of the good results which he has obtained by the administration of chloroform-water with bismuth (water, 150; bismuth, 3; chloroform, 1) in cases of chronic gastric ulcer. He attributes its beneficial effects to its antiseptic, astringent, and hæmostatic properties; at the same time he believes that it exerts a stimulant effect locally, promoting the formation of healthy granulation-tissue and the healing of the ulcer. Barbour<sup>826
Jan., '94</sup> tried papain in a case of ulcer of the stomach, and found that it not only fulfilled the double duty of promoting cicatrization of the ulcer and relieving the dyspeptic symptoms, but caused the pain to entirely disappear. On his side, Boas<sup>126
July 15, '94</sup> is entirely satisfied with the effects of nitrate of silver,—a solution of 0.03 gramme ($\frac{1}{22}$ grain) in 120 grammes (4 ounces) of water; a spoonful thrice daily before meals.

Brissaud,<sup>2
Aug., '94</sup> observing the effect of chlorate of potassium in epitheliomatous growths of the mucous membrane of the upper

digestive tract, was led to try the effect of chlorate of sodium, which is much more soluble, in cancer of the stomach. The results were very remarkable. He begins by giving from 8 to 10 grammes (2 to $2\frac{1}{2}$ drachms) in twenty-four hours and, if the vomiting and hæmatemesis do not cease, he increases the dose until these symptoms are controlled; the maximum dose is 16 grammes (4 drachms) daily. He gives the drug, mixed with 100 grammes ($3\frac{1}{2}$ ounces) of water, in teaspoonful doses. The only contra-indication is the presence of albuminuria, even when slight.

Maibaum ¹⁰⁹_{July, '94} says that, when employed in cases of malignant disease of the internal organs, pyoktanin decidedly arrests the disintegration of these growths, improves digestion, and, on the whole, has a beneficial action on a system suffering from cancerous cachexia. In two of the cases in which he experimented with it, the remedy was administered internally (in pills) 1 grain (0.065 gramme), with $\frac{1}{3}$ grain (0.02 gramme) of extract of belladonna three times a day, after meals. In a third patient the pills intensified the nausea and were substituted by rectal suppositories of pyoktanin, 1 grain (0.065 gramme); extract of belladonna, $\frac{1}{3}$ grain (0.02 gramme); butyri cacao, $\frac{1}{2}$ drachm (2 grammes). Ft. supp. no. viii. One to be inserted three times daily.

Huchard ⁵_{Aug., '94} cites, among the anticancerous remedies, aristol, sodium chlorate, and condurango. Aristol acts internally as does iodoform. Sodium chlorate diminishes vomiting and hæmatemesis, increases the appetite, and combats the cachexia; nevertheless, it has no curative power and is contra-indicated in albuminuria. Condurango stimulates the appetite and the digestive power of the stomach when given as a wine, tincture, or decoction. The diet must be regulated; hydrochloric acid administered up to the time of ulceration, when it must be replaced by pancreatin or pepsin. For the vomiting the choice of remedy must be made according to the emergency,—morphine, cocaine, strychnine, lavage; gastric antiseptics, as sodium chlorate or salicylate, boric acid, naphthol, chloroform-water, benzo-naphthol; nutritive enemata, as that of Leube, Flint, Dujardin-Beaumetz. Surgical treatment does not radically cure, for those operated upon succumb sooner or later to degenerative lesions of the mucous membrane inseparable from cancer.

Subphrenic Abscess.—T. G. Adami ²⁸²_{Mar., '94} describes a case in

which there was primarily a cancer of the cardiac orifice of the stomach, which ulcerated; the septic process extended through the serous surface of the organ, or the walls were perforated by a fish-bone or other fine spicule; suppuration occurred around the termination of the œsophagus, leading to a subdiaphragmatic abscess; extension of the process through the diaphragm caused purulent pericarditis and death. Hodenpyl⁵⁹_{Aug. 4, '94} presented, to the New York Pathological Society, a specimen of subphrenic abscess which had apparently resulted from a perforation of the gall-bladder. A case of subphrenic hydatid cyst is described by Hoffmann.³¹⁹_{June 2, '94} Exploratory puncture confirmed the diagnosis, and operation resulted in perfect recovery.

DISEASES OF THE LIVER.

General Considerations.—Kretz²²_{Apr. 18, '94} read, before the Society of Physicians of Vienna, a paper on hypertrophy and regeneration of the liver, either local or general. Microscopically, he had found the cells in large collections or pressed into the form of small islands, the increase being either in the cell-element or the cell itself, the hypertrophy proceeding in proportion with the hyperplasia. He gave the following classification of cases: (1) where the elements increased regularly; (2) where the volume of an individual part increased peripherally; (3) where the hypertrophy assumed the form of a cell-vegetation, producing new growth. He showed many examples, among them one where the acini alone caused the increase, and typical of a large class, arising from injury, as echinococcus, gumma, inflammation, etc., which destroy a part of the healthy organ, leaving the unaffected portion to increase by compensation, so as often to surpass the original size. This compensating function is an active factor in disease of the liver. Clinical proofs cannot be adduced to show how far this can be followed in cirrhosis, but presumably it is not absent. The author expressed the opinion that this power continues until old age.

J. Leva⁴⁵¹_{Apr., '94} examined functions of the stomach in different diseases of the liver (cancer, echinococci, cirrhosis, cholelithiasis, jaundice, congestion), determining the absorptive power by iodide of potassium and the presence of hydrochloric acid by Günzburg's test. In a majority of cases of cancer the absorbent power of the

stomach was more or less diminished. Examinations for hydrochloric acid gave variable results. The functional power of the stomach was unimpaired. In one case of echinococcus cyst of the liver the secretion of hydrochloric acid was normal and the rate of absorption greatly diminished. The function of the stomach was normal in most cases of cirrhosis of the liver, excepting in the last stages, when the acidity was at or above normal. Both increased and diminished rates of absorption were observed. In cholelithiasis the results permitted of no conclusion. In catarrhal jaundice there was marked diminution in the amount of hydrochloric acid and a diminution in the rate of absorption. When the jaundice disappeared the stomach regained its normal function. In hyperæmia of the liver the function of the stomach was unimpaired.

Roger,¹⁴ Apr. 15, '94 in considering the functions of the liver in infectious diseases, states that most infectious diseases may determine anatomical lesions and functional disturbances in the liver. The lesions vary not only in different diseases, but even in the same disease, running its course in animals of different or the same species. With a microbe which he called the bacillus septicus putridus he produced in the liver thrombosis, hyaline degeneration, embryonic tissue, and systematic periportal thrombosis. All these lesions he also produced with the soluble substances contained in the culture of this bacillus, and they were, in fact, all caused by the same toxic process. It was not enough to know the anatomical lesions of the liver without studying the state of its functions. It was recognized that the liver arrested and transformed a large quantity of poisons brought to it by the portal vein, and more especially the microbial poisons, this function being, as he had already shown, connected with the presence of glycogen. From his experiments he was led to conclude that, in spite of the fever, the liver might continue to destroy the toxins which were formed during acute diseases. These results show the seriousness of infectious diseases in a patient whose liver has been the seat of disease.

Arbuthnot Lane⁶ Oct. 7, '93 has found that Parkin's method of examining the liver is of the greatest service. It consists in placing the patient with the trunk in a position of very considerable flexion, the weight of the upper part being taken off in order to thoroughly relax the abdominal muscles. The surgeon sits behind

the patient, and, passing one hand around either side, examines in detail the upper surface, anterior edge, and under surface of the liver, together with the gall-bladder, through the flaccid parietes, with a facility that is remarkable to one who has never used the method before. Lane has over and over again seen cases in which the objective signs were apparently most obscure, when examined in the ordinary supine posture, cleared up with certainty when placed in this position of considerable flexion.

Jaundice.—The conclusions of a study by Alivia⁵⁹_{Apr. 14, '94} on jaundice and its treatment are as follow: 1. Long-continued biliary stasis, compromising the secreting cells of the parenchyma of the liver and producing a certain anæmia of the organ, markedly reduces and sometimes suppresses the secretion of the biliary acids. The gravity of the phenomena described under the name of biliary intoxication does not, therefore, depend upon the action of these acids. 2. The scarcity or absence of bile in the intestinal canal modifies very seriously the chemical processes there taking place. 3. One of the most common of the gastric changes in icterus is the suppression of hydrochloric-acid secretion. 4. There is little or no loss of carbonate of sodium in these cases. 5. The reaction of the contents of the stomach is usually alkaline, less often neutral or faintly acid. 6. The physiological activity of the bile and of the pancreatic juice in the intestine is retarded. 7. The chlorides in the urine are increased; the reaction of the fluid is often alkaline; there is a diminution of urea, with an abundance of products of the aromatic series. 8. The more marked these characters, the graver the disease and its clinical manifestations. 9. Alkaline treatment does not modify these conditions. The effect of the acid treatment is, however, to diminish the chlorides, to restore the normal acidity of the urinary reaction, to increase the excretion of urea, and to reduce that of the aromatic products; and, at the same time, there is a progressive increase in the weight of the body.

Bouchard⁵⁹_{Apr. 14, '94} maintains that the cutaneous pruritus, so common in jaundice from retention, may appear and persist a long time before the icterus is evident. This precocious pruritus is observed especially in cases in which the obstruction to the flow of the bile is caused by a neoplasm situated somewhere along the course of the biliary passages. Cases of obstructive jaundice from

malignant disease are reported by J. Hutchinson ⁸⁰⁶_{Jan., '94} and J. Burney Yeo. ¹⁰⁷⁷_{Apr. 18, '94}. In one of Hutchinson's cases the jaundice persisted until death in the eighth week, and on post-mortem examination the cause of the obstruction was found to be a glandular carcinoma of the head of the pancreas, involving by pressure the bile-duct. In the other case there was an ill-defined swelling about the region of the gall-bladder, and an exploratory cholecystotomy showed a round, hard growth adhering to the common duct and occluding it. In the case of J. Burney Yeo the onset of the illness with strictly-gastric symptoms, the persistent and growing intensity of the jaundice, its long duration, and the grave wasting cachexia accompanying it seemed to point to the pyloric end of the stomach as probably the original seat of a malignant disease which had infected secondarily the glands in its neighborhood and the liver itself. Bezançon ⁷_{No. 23, '93} describes a case of chronic jaundice in which obstruction of the hepatic duct by an epithelioma developed at the hilus of the liver was found post-mortem. A good critical review of the treatment of obstructive jaundice is given by Dujardin-Beaumetz, ⁶⁷_{Apr. 15, '94} while Ferrand ³²_{May 2, '94} and Maragliano ⁵⁸⁹_{June 9, '94} contribute interesting clinical lectures on icterus and its treatment in general. The good effects of olive-oil in the treatment of jaundice due to simple obstruction are confirmed by T. Oliver, ⁶_{Oct. 7, '93} who describes two cases in which this method was followed by signal success.

Icterus Gravis.—The communication made by Hanot at the Société Médicale des Hôpitaux, on the micro-organisms found by him in cases of icterus gravis, has led Vincent ³⁶⁰_{Dec. 1, '93} to publish a similar observation of his own in which he was able to detect the bacillus coli in the blood and organs of a patient who died of icterus gravis. He does not think, however, that this micro-organism may be regarded as the sole producer of this form; he is rather inclined to believe that the infectious hepatic process may be produced by germs of a different kind. Hanot ¹⁴_{Feb. 21, May 6, '94} relates several other cases of the same form, in one of which it was possible to demonstrate the bacillus coli during life, in the blood of the liver and in the blood drawn from a vein in the bend of the elbow, and, after death, in the hepatic cells. The form of icterus gravis in which the bacillus coli is found is accompanied by lowering of the temperature, whilst the other forms of the same disease which are accompanied by fever are characterized by the presence

in the liver and blood of pyrogenic microbes. Undoubtedly, however, the micro-organisms play a rôle in the production of the lesions and symptoms of icterus gravis. J. Durante⁷_{No.24,'94} observed a case of primary icterus gravis in which the temperature always ranged below the normal. Death followed. Cultivations made with the blood and liver remained sterile and no micro-organism was demonstrated on staining the sections of the organ. The author thinks that this case belongs to a non-infectious form of apyretic jaundice, which must be admitted, and the development of which is attributable to poisoning (phosphorus) or to an auto-intoxication, probably of intestinal origin.

Relying upon a number of clinical observations, Pal³¹⁹_{June 2,'94} is of the opinion that the icterus which not rarely occurs in certain infectious diseases is, in the majority of cases, a manifestation of the general infection and of the consequent involvement of the biliary passages, and must not be ascribed to a gastro-duodenal catarrh.

Babes¹²⁶_{July 15,'94} describes four cases of icterus gravis in which the results of bacteriological examination led him to conclude that they could be regarded as variable stages of the same form of septicæmia caused by streptococci. In two of these cases there was an acute invasion by those micro-organisms. In the other two the streptococci were not found in the hepatic parenchyma, and such an absence was explained by the fact that in proportion as the hepatic cells degenerated the streptococci disappeared with them, as Babes was able to prove by injecting cultures of streptococci into rabbits.

Arnozan²⁵_{June,'94} describes the failure of therapeutics in cases of primary icterus gravis to ignorance of its pathology as well as to the gravity of the affection. The discovery of the microbic origin of this disease has indicated the antiseptic method of treatment; and, as showing success of this method, he narrates a very instructive case in which the patient was put on a milk diet with naphthol- β , sulphate of quinine, and charcoal daily (1.20 grammes—18½ grains—of each, divided into eight doses), and received morning and evening a subcutaneous injection of 0.01 gramme ($\frac{1}{6}$ grain) of carbolic acid diluted in $\frac{1}{2}$ cubic centimetre ($7\frac{3}{4}$ minims) of distilled water.

Epidemic Jaundice.—W. Hall Calvert,²_{Feb.3,'94} describes a form

of epidemic jaundice observed by him, and for which no cause was discoverable excepting a history of something like influenza in some of the cases. Similar cases were subsequently reported by Pope Bartlett, ²_{Feb. 24, '94} Semple Young, ²_{Mar. 3, '94} Thursfield, Hawthorn, Roche, ²_{Mar. 10, '94} Holmes, ²_{Mar. 31, '94} Cullen, ²_{Apr. 14, '94} and Rankin. ²_{May 26, '94} All these contributors agree on the point that jaundice is a sequela and a concomitant of influenza, and that its appearance is favored by mild, wet weather in autumn. It seems also established that in those cases where the jaundice seemingly appears independently, at a time when influenza is prevalent, one has to deal with an uncommon manifestation of the latter disease.

Emotional Icterus.—E. A. Lubbock, ²_{Apr. 21, '94} reports a case of jaundice developed after an instrumental delivery in a highly-sensitive young lady. Coulon ²_{May 19, '94} records three cases in which jaundice supervened in children of nervous diathesis after emotional excitement, and a similar case is described by Variot. Potain, ³_{Aug. 22, '94} in relating an observation of the same kind, discusses the pathogeny of this form, and thinks it may be explained only by admitting a modification in the normal relations between the pressure of blood-capillaries and that of the biliary capillaries, the former becoming less and the latter more elevated. This modification, as experimentally shown by Franek, may be induced under the influence of an excitation of the nervous centres.

Infectious Liver.—L. Levi ³⁶⁰_{Mar., '94} relates a case which he considers as one of the links in the chain uniting "icterus gravis" (hyperacute form) and hypertrophic cirrhosis with chronic icterus (chronic form). A young man was suddenly taken with febrile disease of infectious character, with tumor of the spleen. On the twenty-first day a little icterus appeared, which increased and became permanent. Symptoms of endocarditis, meningitis, and nephritis set in, and after fifty-one days of illness the patient died. On post-mortem examination the liver showed a sclerosis of the portal vessels and gall-ducts, with relative integrity of the hepatic cells. Bacteriological examination of the pus of the meninges and of kidneys, spleen, and liver revealed the presence of a diplococcus colored by Gram's method and pathogenic to guinea-pigs. This micro-organism is, according to the author, a customary or accidental visitant of the intestine, that in this case became infectious for the liver, which on its side infected secondarily through the

venous channels the heart, and through the arterial vessels the kidneys and meninges.

Tropical Hepatitis.—According to Kartulis³_{Sept. 12, '94} the frequency of hepatitis in tropical countries is explained by the existence of specific agencies operating with particular intensity upon the functions of the liver consecutive to digestive disorders. Besides high temperature of the climate, the causes predisposing to hepatitis are much more common in hot countries than in temperate zones, and among them must be considered ague, dysentery, different parasites, alimentation, and abuse of alcohol,—all of which disturb the digestive functions. The forms of hepatitis observed in Egypt are acute and chronic, the former very commonly ending in suppuration. Some peculiar chronic forms are hepatalgia, malarial hepatitis, and bilharzia hepatitis.

Acute Yellow Atrophy.—Dreschfeld²_{Feb. 10, '94} showed the liver and microscopical sections from a patient whose history was as follows: He had always enjoyed good health, and there was no syphilis nor alcoholism. In the beginning of June, 1892, he first became jaundiced, and a few days later diminution of the liver-dullness and slight enlargement of the spleen could be discerned. The jaundice rapidly deepened. The urine contained biliary coloring matter and the fæces showed absence of bile. There was an absence of all other symptoms usually present. Death occurred on July 21st. At the post-mortem examination the liver was found to be much diminished in size, weighing 15 ounces (465 grammes), and presenting to the naked eye, and microscopically, the characteristic appearances of yellow and red atrophy. Sections of the liver stained by various methods did not show the presence of any micro-organisms. Dreschfeld is inclined to look upon the symptoms of acute yellow atrophy as due to some toxic body, the product of certain micro-organisms.

McPhedran and Macallum,²_{Feb. 10, '94} in describing a case of acute yellow atrophy of the liver, in which they made a minute histological examination, discuss the etiology of the disease, which they attribute to the presence of a poisonous element of the nature of a chemical compound, probably an abnormal albumin, resulting from deranged or putrefactive processes in the intestine, absorbed by capillary radicles of the portal vein and carried to the liver, where it first meets the hepatic cells at the periphery of the lobules,

bringing about their destruction. The destruction, once begun, is continued in the remaining cells of the lobules more or less affected by the poison, and is assisted by the absorbed secretions, and the impossibility of the liver-cells in some cases to throw their secretions into the already overdilated bile-capillaries.

Foges ⁵⁷_{Feb. 25, '94} relates the case of a man, 25 years of age, who was seized by an œdema beginning over the lower part of the sternum and gradually involving the scrotum, the lower extremities, and the hands. Associated with this there were severe pains in the back and epigastrium, bloody expectoration, jaundice, dyspnoea, and finally collapse. The autopsy revealed chronic interstitial nephritis, cardiac hypertrophy and chronic myocarditis; infarction of the lungs, spleen, and suprarenal capsules; thrombosis of the portal vein, and acute yellow and red atrophy of the liver. According to the author, the kidneys and heart were the starting-points of the other manifestations. A case of acute yellow atrophy followed by healing is described by E. Wirsing. ⁶⁹_{May 17, '94} Merkel ³⁴_{May 22, '94} reports an unusual case of acute yellow atrophy of the liver occurring in a child aged only 6 years, post-mortem examination confirming the diagnosis. The cause of the disease could not be determined. Other cases are described by Schreiber, ³¹⁷_{May 26, '94} Stone, ²_{July 14, '94} and Shattuck. ⁹⁹_{July 26, '94} Babes ⁵_{Sept. 7, '94} describes four cases of virulent streptococcal infection which ran the typical course of acute yellow atrophy. In three of the cases the streptococci were present in the liver as well as in other organs, and in two were found in enormous numbers completely blocking many of the smaller vessels of the liver, and so presumably aiding in the production of the degeneration. Babes suggests that a liver, already weakened by the existence of some chronic degenerative lesion, may lend itself readily to the destructive effect of the streptococci and their poisons.

Suppurative Enterohepatitis.—At the International Medical Congress of Rome Babes ²_{Apr. 7, '94} referred to certain diseases prevalent in Roumania, especially a disease which he calls enterohepatitis suppurativa, and which is not dysenteric in character. Small pustules first appear in the lower part of the ascending colon and then burst open. There is well-marked œdema of the surrounding parts, which may go on to retroperitoneal abscesses perforating the intestine, or gangrene of the bowel may follow. This enteritis is

always accompanied by an abscess of the liver or necrosis of certain parts of that organ. Amœbæ were found in the intestines by the author, but these had also been found in ordinary diarrhœa; though he had not met with them after death or in abscesses of the liver during life or after death. As a rule the abscesses were sterile, but in some cases there were various ill-defined micro-organisms. In the discussion which followed, Cornil stated that no organism has been proved to be the cause of dysentery, and Virchow, while admitting that he himself showed amœbæ in cases of dysentery, said that their etiological action was uncertain. On the contrary, Kauffmann, of Cairo, considered amœbæ as the cause of dysenteric diarrhœa, and said that he had also seen them in one case of abscess of the liver.

Abscess.—A fatal case of hepatic abscess, in which during life a diagnosis of cancer had been made, is reported by Bezançon.⁷_{Jan., '94} Several ulcerations were found in the cæcum, to which probably the hepatic abscess was attributable. Hale White⁶_{Mar. 3, '94} describes a case of abscess of the liver associated with ulcerative colitis, not dysenteric, and thinks it possible that some cases of ulcerative colitis, like dysentery, may have an hepatic abscess associated with them. Laroche¹⁸⁸_{Mar. 11, '94} records a case of hepatic abscess which could be attributed to no other cause than a severe traumatism. After exploratory tapping the abscess was opened by a large incision, and a piece of gangrenous hepatic tissue was found in the cavity, wholly separated from the remainder of the organ. The patient recovered satisfactorily.

Wysman and Grippeling⁴_{Mar. 26, '94} describe a case of abscess of the liver characterized by a linguiform enlargement of the left lobe, without enlargement of the remainder of the organ. In this case no cause could be determined. Operation was followed by a good result. In a case described by Wintras²_{Mar. 31, '94} the right lobe was occupied by a large, irregular abscess-cavity, and there was hardly any liver-substance left; the left lobe was much jaundiced, but not otherwise affected. L. von Lingen²¹_{July 21, '94} observed a case of hepatic abscess in St. Petersburg, where this disease is exceedingly rare. He attributes its origin to an infection starting from the duodenum, the patient having previously suffered from an infectious gastro-duodenal catarrh.

Legrand¹⁰_{July 31, '94} records two cases of tropical abscess of the liver

in infants. The pus of the abscess contained a micro-organism which, by culture experiments, was identified with the staphylococcus citreus. In one of the cases death followed, despite an operation; in the other, surgical treatment led to recovery. In the case of Regaud ²¹¹_{Aug. 5, '94} the diagnosis remained doubtful during life, even exploratory puncture giving a negative result. On post-mortem examination it was found that the whole right lobe was transformed into a purulent cavity containing about 1200 grammes ($2\frac{1}{5}$ pints) of very thick pus; in the large intestine, and especially in the cæcum and descending colon, there were numerous yellowish ulcerations. A case of abscess of the liver recurring after a successful operation and ending in death is recorded by Thacker. ⁵⁹_{Aug. 4, '94} J. M. Byron ⁵⁹_{Aug. 4, '94} reports a case in which the diagnosis of empyema was made, because exploratory puncture and the physical signs pointed to this condition. An opening was made on the right side at the usual point and some pus withdrawn. The man died, and on autopsy absolutely nothing was found in the pleural cavities except a very slight pleuritis on the right side. In the posterior and upper part of the right lobe of the liver, however, was a very large abscess-cavity, which communicated with the operation-wound. The diaphragm was intact. There was no ulceration in the intestines nor anything to account for this abscess in the liver.

From personal experience during some years, Neil Macleod ²_{Mar. 31, '94} is convinced that the question whether dysentery is the invariable precursor of "tropical" liver-abscess should be practically answered in the affirmative; and that the facts urged against this view—namely, the absence, in certain cases, of a history of bowel disturbance or of ulceration of the large intestine on post-mortem examination—have another interpretation (and by this is meant cases in which the suppurative process is not a part of a general pyæmia nor connected with gall-stones, hydatids, nor operative procedure on the large bowel).

Three cases of hepatic abscess of dysenteric origin with perfectly-sterile pus are described,—two by Laveran, ¹¹_{Dec. 6, '93} in which the disease had run a slow course, and one by Petit, ¹¹_{Jan. 14, '94} in which, on the contrary, the development had been acute. Laveran thinks that the sterile pus is found mostly in old abscesses, whilst the acute ones contain micro-organisms, and that, therefore, hepatic abscesses are of microbic origin, but that the microbes die rapidly

in their pus. On his side, Petit disputes this view, showing by his case that the absence of micro-organisms in the pus of hepatic abscesses of dysenteric origin is not characteristic of chronic abscess, for the same peculiarity may be observed in connection with acute abscesses. Bacteriological examination of the pus of an abscess of the liver following dysentery revealed to Bertrand¹⁴_{Apr. 18, '94} many micro-organisms, as the staphylococcus pyogenes, the bacillus of Eberth, and a microbe not yet determined. He thinks, therefore, that the pus of these abscesses is not sterile, as has been affirmed, or that such a sterility is only apparent; and he finds in his observation another proof of the microbic non-specific origin and nature of suppurative hepatitis. On the contrary, Rendu,¹⁴_{June 3, '94} in a case of hepatic abscess of doubtful origin, found in the pus the streptococcus pyogenes, but cultures of this pus remained sterile, which fact led him to conclude that the microbes of hepatic supuration may perhaps lose their virulence under the destructive action of the liver.

Cirrhosis.—From an analysis of the lesions of cirrhosis, Senator⁷⁶⁰_{Jan. 27, '94} classifies the different forms of this disease in the following way: 1. Laennec's portal granular atrophy of the liver; atrophy of the liver, with uneven surface; ascites; periphlebitis of the portal vein; tumor of the spleen; no icterus. A variety of this form may show hypertrophy of the liver,—rare cases in which the fatty infiltration causes swelling. Another variety would be cases in which jaundice occurs, due to accidental obstruction of the biliary duct (inflammation or gastro-intestinal catarrh). 2. Biliary cirrhosis with consecutive atrophy. This form would originate from and be characterized by chronic obstruction of the biliary duct by stones, etc. It may be associated with swelling of the spleen (cause doubtful). 3. Hanot's hypertrophic cirrhosis with icterus. There would still remain a small number of cases that could only be classified as chronic interstitial hepatitis, with or without chronic splenitis,—cases that do not belong strictly to any of the three classes mentioned.

From his clinical and anatomico-pathological studies on hepatic cirrhosis, Cantieri⁵⁹_{Apr. 14, '94} concludes that the distinctions made between the several varieties are superfluous, since the disease always consists in a connective-tissue hyperplasia caused by an infection or intoxication. The most common causes are the abuse of wine

or spirituous liquors, or the habitual ingestion of too highly seasoned food; the closure of the common duct by a calculus; the penetration of intestinal micro-organisms into the organ through the blood of the portal vein or through the stagnant and altered bile filling the canaliculi; or poisoning by the biochemical microbic products present in quantity in the intestines or blood. In malarial cirrhosis we find in the liver a great number of pigment-granules, the remains of the red blood-globules destroyed by the plasmodium, and also other minute corpuscles which are believed to be the scorix of the plasmodia. All these corpuscles collected in the liver, which can no longer exercise its epurating functions, remain there as inert bodies, but they inflame the walls of the portal vein which brings them there, and also, perhaps, the bile-ducts, as a result of which malarial cirrhosis partakes of the clearly-marked characters of neither venous nor biliary cirrhosis. The other forms, whether with fatty or amyloid degeneration, tuberculosis, or cancer, are still varieties of cirrhosis, either venous or biliary or mixed; the other diseases or forms of degeneration are merely accidental complications which cannot rightly give their name to the hepatic disease.

Hanot, ¹⁴_{Apr. 8, '94} recalling the form of hepatic cirrhosis described by him in 1875 with the name of hypertrophic cirrhosis with chronic jaundice, says that the anatomical lesions found in the cases belonging to this variety correspond to those of the infectious liver, experimentally produced or discovered after death following an infectious disease. For this reason he is inclined to believe that such a form is probably an infectious cirrhosis, and does not depend primarily on alcoholism. In two cases of this kind he has found a diplococcus in the blood of the heart and lungs and in the capillary vessels on section of the liver.

The same author, with Boix, ¹¹_{Apr. 8, '94} described, at the International Medical Congress, a form of cirrhosis of the liver which did not belong etiologically to any of the established categories. In all of the cases of this group a history of alcoholism can be definitely excluded, while tuberculosis, syphilis, malaria, and other infectious diseases cannot be demonstrated. These cases do, however, present a history of digestive derangement, extending over many years, with or without gastrectasia. Histologically a general sclerosis of the portal spaces may be found, with preservation

of the central vein. The interlobular connective tissue extends, in varying degree, into the lobules themselves; but there is no hyperplasia of the biliary ducts. The origin of this form of sclerosis is to be attributed to the long-standing digestive derangement, in consequence of which toxic substances are generated in the gastro-intestinal canal. These are absorbed by the veins, and must find their way through the liver by the portal vein, giving rise, in their passage, to irritation and cellular proliferation.

G. Banti³_{July 11, '94} calls attention to a peculiar symptomatic and anatomical complex, hitherto undescribed, which he calls "splenomegaly with cirrhosis of the liver." The symptoms may be divided into the pre-ascitic, the ascitic, and the intermediate. Those of the pre-ascitic period are splenic enlargement and anæmia, the disease beginning with splenic hypertrophy, and anæmia following. The intermediate period is characterized by the appearance of dyspeptic and intestinal disorders and sometimes of hæmorrhoids, and by the urine becoming scanty, dark-red in color, and charged with urates. In the ascitic period ascites supervenes. The anatomical lesions are hypertrophy of the spleen, atrophic hepatic cirrhosis, and alteration of the medulla of the bones (which is red), of the aspect of the foetal medulla, and contains a great number of nucleated red corpuscles. The etiology of the disease is absolutely negative. The affection differs from hepatic cirrhosis with splenic tumor by the absence of any of its causes, by its beginning with splenic hypertrophy, the progressive anæmia of the first stage, and the histological lesions of the spleen, which are different from those produced by stasis. Perhaps this peculiar form might be considered as a more advanced stage of splenic anæmia; or, more probably, it has an infectious origin, and the morbid causes display their action from the beginning upon the spleen.

Cases of alcoholic cirrhosis are described by Jayle⁷_{Jan., '94} and Meslay.⁷_{No. 3, '94} A case described by Levi,⁷_{No. 7, '94} in which the disease began under the form of a subacute hepatitis, in a woman 39 years old, non-alcoholic, and ended in death after having shown several interesting nervous, cardiac, and pulmonary phenomena, leads one to discuss the question of an infectious origin in some ulceration which was found in the rectum and anus.

Senator⁶⁹_{Feb. 15, '94} related to the Medical Society of Berlin two

cases of biliary cirrhosis of the liver. The first was a typical case following absolute closure of the biliary passages. In the second the gall-bladder was found closed toward the cystic duct; no calculus was present, but a small carcinoma was found at the opening of the ductus choledochus into the duodenum. Markwald¹³_{Aug., '94} describes a peculiar case in which there was a combination of partial hypertrophy and atrophy of the liver-substance. He thinks that the essential process was the atrophy, and the hypertrophy of some portions was due to a regenerative neo-formation of the hepatic structure.

Wyatt Johnston²⁸²_{Nov., '93} exhibited, before the Montreal Medico-Chirurgical Society, specimens from a case of hepatic cirrhosis with icterus. In this case no changes were discovered, at the autopsy or by microscopical examination, to show that the jaundice was obstructive or had anything to do with the anatomical changes in the bile-passages; it was, therefore, not an example of the biliary cirrhosis of French writers. T. Norris Vincent⁸¹_{Feb., '94} describes a case of cirrhosis of the liver, complicated with delirium tremens and hæmorrhage, of interest on account of the lack of the usual symptoms of cirrhosis of the liver and of any constitutional trouble that might throw light upon the severity of the hæmorrhage. Graham Steell⁹⁰_{Feb., '94} relates a case of cirrhosis of the liver in which an ulcerative or septic endocarditis had been the apparent cause of pyrexia in the course of the disease. H. V. Webber⁶_{Apr. 21, '94} refers to a case presenting some unusual symptoms, such as hæmorrhage from the gums and the ears, hæmoptysis, and pyrexia.

Cornet²²⁸_{May 15, '94} reports the following case: A young woman, aged 22, having suffered from spitting of blood for about eight months, and from vomiting of blood for two days, passed into a comatose state and died. The autopsy revealed an atrophied liver and varices at the termination of the œsophagus. Diagnosis during life had been impossible, and the nature of the case remained an enigma until revealed by post-mortem examination. Cirrhosis was not suspected, owing to the absence of digestive troubles and of ascites and the age of the patient.

Cirelli³¹⁹_{Sept. 1, '94} referring to the asserted curability of hepatic cirrhosis by strict milk diet and iodide of potassium, says that true cirrhosis of the liver, because of its anatomical lesions, is an

incurable process, and that the cases of healing are probably examples of that chronic congestive condition of the liver which not infrequently develops under the influence of malarial poisoning and alcoholism.

The importance of the treatment of the initial—"precirrhotic"—stage of cirrhosis of the liver is insisted upon by Hanot ³_{Feb. 21, '94} on the ground that not only are the different troubles (dyspeptic disorders, epistaxis, hæmorrhoids, localized œdemas, etc.) subdued, but the course of the hepatic affection is retarded and the danger of the numerous infectious processes, to which patients with hepatic cirrhosis are predisposed, is lessened. The method of treatment recommended by Hanot in this period consists in modifying as much as possible the arthritic condition in which cirrhosis develops in the majority of cases; in interdicting the use of alcoholic drinks, and in correcting the noxious effects already produced by them in the organism; in effecting the intestinal antiseptics made necessary by the deficiency in the antitoxic function of the liver.

Hypertrophic Cirrhosis.—Freyhan ²⁶_{May 1, '94} endeavored to determine whether hypertrophic cirrhosis of the liver is a disease *sui generis* or not, and for this purpose carefully analyzed eight typical cases under his care. He concludes that it cannot be denied that the anatomical conditions, and more especially the histological details, do not permit a sharp and precise diagnosis between the atrophic and hypertrophic forms of cirrhosis of the liver; but over and above anatomical conditions the clinical details of the two maladies must be considered, and these show, in the most unequivocal manner, that the two diseases must be looked upon as totally distinct. Cases of atrophic cirrhosis run a slow apyretic course; the liver diminishes in volume, there is considerable ascites, and jaundice, as a rule, is absent. On the other hand, in the hypertrophic forms, the liver is greatly and uniformly enlarged; there is no ascites, but intense icterus. In addition to these all-important points of difference there are, also, numerous others of less note. The rarity of the affection, and the occurrence of cases which are not fully developed, and in which the typical features of the disease are blurred, render error in diagnosis possible. The differential diagnosis between hypertrophic cirrhosis of the liver and other maladies of that organ is, however, as a

rule, easy. The author, therefore, holds that atrophic and hypertrophic cirrhosis are distinct affections, and considers this opinion justified by the clinical course and symptoms of the two diseases.

Talbot Jones¹⁰⁵_{June 1, '94} presented, to the Minnesota Academy of Medicine, specimens removed from the body of a female, aged 28 years, who had been ill for two weeks previous to entering hospital, and was of dissolute habits and a hard spirit-drinker. A diagnosis was made of croupous pneumonia, enlargement of the liver, aortic stenosis, contracted kidney, and general anasarca. The autopsy confirmed the diagnosis and showed a typical example of hypertrophic cirrhosis of the liver,—the so-called biliary cirrhosis of the French. Bezançon⁷_{No. 23, '93} describes a case of alcoholic hypertrophic cirrhosis of the liver, associated with an alveolar epithelioma with polymorphous cells. J. T. Brooks¹⁵⁷_{Oct., '93} relates a case of hypertrophic hepatic cirrhosis with marked icterus, the predisposing and exciting causes of which were highly-seasoned food, malarial toxæmia, alcoholism, and depressed vital resisting power, induced by an acute articular rheumatism.

In the treatment of hypertrophic cirrhosis of the liver, Liebreich¹⁵_{Apr., '94} insists at the outset on the importance and efficacy of calomel, together with milk diet. In the biliary form (with intense jaundice) he orders injections of salicylate of sodium, 15 to 30 grains (1 to 2 grammes) to $\frac{1}{2}$ litre (pint) of water, to be repeated daily. In addition he recommends massage of the liver, exhibition of reputed cholagogues, appropriate diet, hot baths (with massage in the bath), and a course at an alkaline spring.

Cirrhosis in Children.—D'Espine⁹_{Oct. 26, '93} reports the case of a boy, 6 $\frac{1}{2}$ years old, who had been robust until the appearance of symptoms of hypertrophic cirrhosis of the liver, which terminated fatally at the end of three years. The liver extended two fingers' breadth below the level of the umbilicus; the spleen was enlarged; an ascitic effusion occupied the peritoneal cavity, and the veins of the anterior abdominal wall were greatly enlarged. After death an intense interstitial hepatitis was found, with perihepatitis and perisplenitis. A case of atrophic cirrhosis in a boy aged 10 years is described by Blagowjeschtschenski.⁵³⁰_{No. 7, '94; June 30, '94} and J. M. Clarke²_{June 30, '94} narrates several similar cases in children, and describes and discusses the pathological changes observed. J. Hutchinson⁸⁰⁶_{Jan., '93} saw a young man, aged 28 years, who had been cured by him, when 9

years old, of a "drunkard's liver." He was now in fair health. Hutchinson regards this case as an example of infantile hepatic cirrhosis (?) cured. Jacoby, ⁵¹_{Nov., '93} in a clinical lecture, stated that cirrhosis of the liver, as a result of chronic alcoholism, is seen sometimes in children, and showed a case of hypertrophic cirrhosis of this kind in a child about 4 years old. A case of the same nature, but of the atrophic variety, is described by Sainsbury. It was successfully treated by early tapping, but the child died some months after from meningitis, probably tubercular. On section the liver was found plainly, but not extremely, cirrhotic. Marchand ⁴_{July 30, '94} showed the Aertztlicher Verein, at Marburg, the specimens of a case of alcoholic cirrhosis of the liver in a child 7 years old.

Hydatid Cysts.—Boinet ⁵⁰_{Apr. 14, '94} has extracted from hydatid cysts of the liver a ptomaine, 0.003 gramme ($\frac{3}{64}$ grain) of which injected under the skin of a mouse caused death in five minutes; 0.05 gramme ($\frac{7}{8}$ grain) injected into the veins of a rabbit gave rise to symptoms of hydatid intoxication, convulsions; first accelerated, then retarded respiration, rapid action of the heart, dilatation of the pupils, collapse, and a reduction of temperature to about 80° F. (26.7° C.). Death was preceded by a few convulsive attacks. A patient with hydatids of the liver succumbed with symptoms of rapid respiration and convulsions, followed by paresis of the lower extremities very similar to those observed in the animals experimented upon. This toxin is found more abundantly in cases in which puncture and electrolysis have modified the vitality of the hydatids, transforming the clear fluid into a yellowish, turbid, syrupy liquid, rich in albuminoid matters. It resembles the mytilotoxin of mussels, and results from the reduplication of the albuminoid matters. This ptomaine seems to exercise a toxic action upon the still intact hydatid vesicles, causing their aseptic necrosis and death.

Santoni, ⁸¹⁴_{Apr. 15, '94} by auscultatory percussion, has found that the stethoscope reveals a special and peculiar sound of sonorous quality having a low tone and of brief duration, which ceases abruptly. It may be compared to the sound produced by striking a membrane stretched upon a metallic frame. This sound is so characteristic that, once heard, it can hardly be forgotten. He considers it as a pathognomonic sign of the disease.

Among the cases of hydatid cysts of the liver described the following are worthy of notice: Bezançon and Bouchard⁷_{No.22,'93} relate a case of multiple cysts of the liver, of biliary origin, with effusion of the blood into their cavities. Meslay and Raffray⁷_{No.1,'94} report a case of hydatid cyst of the liver suppurating and opening in the lung. Death ensued after several useless trials of tapping and emptying the cyst. A very similar case is related by Valmorel.⁷_{No.7,'94} The cysts opened in the pleura. On post-mortem examination, besides the hydatid cysts, an hepatic cirrhosis was found. In the case of Schandelin⁴_{Mar.26,'94} there was an hydatid cyst of the liver, enormously enlarged, and complicated by a circumscribed purulent peritonitis. Hobbs⁷⁰_{June 30,'94} showed, to the Société d'Anatomie et de Physiologie of Bordeaux, the specimen of a liver in which three hydatid cysts were found. The symptoms observed during life had been jaundice, enlargement of the liver, and ascites. Queyrat⁹²_{June 10,'94} describes a case of hydatid cyst of the liver communicating with gall-ducts, which healed completely after the operation. Blumer²¹⁴_{Apr.1,'94} reports the case of a woman who had suffered with an echinococcus of the liver for fifteen years. Exploratory puncture followed by aspiration gave exit to an homogeneous, yellowish, emulsion-like liquid, but in the course of a few days the cyst had resumed its previous proportions. After the lapse of several weeks it was again punctured, but could not be entirely emptied, as the cannula repeatedly became obstructed. After about an ounce (31 grammes) of fluid had been removed, 5 drachms (20 grammes) of a 1 to 1000 solution of mercuric chloride were injected into the cavity of the cyst. As the swelling did not become notably reduced in size, a third puncture was made, a large trocar being employed, four quarts (litres) of homogeneous, dirty-amber fluid evacuated, and an ounce (31 grammes) of mercurial solution again injected. The tumor, nevertheless, rapidly increased in size, but did not reach its former proportions. The general state of the patient now notably improved, and the condition seemed to indicate a gradual subsidence. In a case of Lee Dickinson²_{Nov.11,'93} the cyst had been opened during life, and a large number of dead, collapsed hydatids evacuated, together with a fatty substance containing crystals of bilirubin. The author believes these to be derived from the bile rather than from the blood, for they are seldom seen in other hydatids than those of the liver.

Cancer.—From the histological examination of three cases of primary cancer of the liver, Dallemagne⁸⁶⁸_{June 23, '94} concludes that the biliary epithelium or the hepatic trabeculae may serve by turns as the starting-point of the neoplasm, and that, therefore, the possibility of primary biliary cancer cannot be denied.

Descroizilles¹¹⁸_{June, '94} describes a case of cancer of the liver in a girl, 11 years old, who died four days after admission into hospital, and in whom, during life, an enormous tumor was observed in the abdomen, mostly in the right hypochondrium and fossa iliaca. There were dyspeptic symptoms, pains in the hepatic region, tympanites, but no jaundice, alterations of the pulse-rate, nor fever. On post-mortem examination the liver was found much enlarged, with numerous whitish-yellow protuberances, the cancerous nature of which was demonstrated microscopically. In the right iliac fossa another tumor existed, due to a cancerous infiltration of the ganglia and of part of the small intestine. This was probably to be considered as the primary lesion. II. W. Blunt relates a case of cancer of the liver in a woman 85 years of age. The patient had always enjoyed remarkably good health until about eight months before her death, when she began to lose in flesh and strength and occasionally had slight pains in the right hypochondriac region. Enlargement of this region, with jaundice, anorexia, and intense thirst occurred; the patient rapidly became weak and exhausted, and death occurred about twenty-five days after she first took to her bed. The autopsy confirmed the diagnosis of cancer. A case of primary hepatic cancer is reported by Pauly,²¹¹_{July 16, '94} in which during life no symptom of insufficiency of the liver-functions had been observed. Hodenpyl⁵⁹_{Aug. 11, '94} presented to the New York Pathological Society specimens of a case of carcinoma of the liver, stomach, and lungs. The case was remarkable on account of the enormous extent of the lesion, the very short duration of the disease, and the very moderate discomfort which it caused.

A case of pylephlebitis of cancerous origin is described by Marie and Follet,⁷_{No. 2, '94} in a patient with cancer of the rectum, who died of peritonitis. At the post-mortem examination the portal vein and its roots and the splenic vein were found obstructed by thrombi. Dionisi⁵⁸⁹_{Mar. 15, '94} observed a case of sclerosis, with aneurismal ectasia of the portal vein, which showed extensive calcareous degeneration.

Sarcoma.—A. Jacobi⁵¹_{Dec., '93} showed a boy with a semifluctuating tumor of the liver, for which he made a diagnosis of cystosarcoma. He introduced an aspirator and obtained no fluid other than blood. E. R. Axtell¹_{Mar. 3, '94} relates the case of a child, aged 3½ years, in which a hard, round, smooth, not movable tumor was discovered in the left half of the epigastrium and in the left hypochondrium, with signs of pressure upon the portal vein or its radicles (ascites, distension of superficial veins). The diagnosis remained uncertain. On post-mortem examination the liver was found greatly enlarged; its entire upper two-thirds presented no hepatic structure, but were thrown up in three tumor-masses, one of which sprang anteriorly from the left border of the right lobe, and was that found in the physical examination. From the naked-eye appearance of the tumor-sections, a diagnosis of sarcoma was made. Later, microscopical sections of various parts of the infiltrating mass showed it to be a small round-celled sarcoma.

Tuberculosis.—Hanot¹⁴_{Nov. 1, '93} calls attention to a peculiar lesion observed by him in the liver of several tuberculous patients, in the form of small yellowish knots, very similar to those found in the same organ in cases of enteric fever, but containing the tubercle bacilli. They do not present, however, the structure of tuberculi, as giant-cells are not discoverable in them. It appears, therefore, that they constitute a peculiar variety of hepatic tuberculosis. Macaigne and Finet⁷_{No. 10, '94} describe a case of nodular diffuse hepatitis in a patient with caseous phthisis of both lungs. Bacteriological examination gave a negative result. It was not possible, therefore, to explain the hepatic lesions by diffuse bacillary infection, and it seemed much more probable that tubercular intoxication had acted upon the secreting element itself, and the irritation thus provoked had given rise to the cellular reaction and to the hyperplasia of the parts primarily affected. Kotlar,¹³_{Sept. 15, '94} from his researches in three cases of tubercular cavities of the liver, comes to the conclusion that two varieties of these cavities are to be distinguished: some of them have no connection at all with the biliary channels and do not contain any bile, while others are in communication with the biliary channels and contain bile; the lesion of the biliary channels is, however, not a primary one, the channels being secondarily altered by the growth of the cavities.

Adenoma.—At the Surgical Congress of Berlin von Berg-

mann ²²_{Mar. 14, '94} showed a patient suffering from tuberos adenoma of the liver, from which he had removed a large piece. The wound healed, the abdomen became soft, the margin of the liver could no longer be felt, and the patient was free from recurrence. The author, therefore, expressed the opinion that tuberos adenomata of the liver were operable. Adami ²⁸²_{July, '94} showed the liver of a wood-chuck at the right extremity of which a tense bulging could be seen. Microscopical examination of the tumor revealed different conditions in the periphery and the central portions. The peripheral specimens showed adenoma of the liver-cells; the central portion showed hæmorrhages, dilated vessels, and cavernous-like spaces characteristic of angioma. The combination of the two conditions, adenoma and angioma, made the case extremely interesting as well as rare. Comparing this with analogous conditions found in the human liver, Adami remarked that in man the liver is perhaps the most frequent seat of angiomata, but that a combined condition, as in this case, is very unusual in the lower animals.

Syphilis.—R. Bensaude ⁷_{No. 10, '94} describes a case of multiple small gummata of the liver without sclerosis, co-existing with peribiliary cavities, a biliary calculus, and adenopathy of the mesenteric and mediastinal ganglia. The spleen was enlarged and all the symptoms of Laennec's cirrhosis existed. W. Osler, ¹_{Apr. 7, '94} in a clinical lecture, spoke of four cases diagnosticated during life as syphilis of the liver, and two of which presented definite tumors. In both the tumor disappeared in a few months under the use of iodide of potassium. The remaining two, which came to autopsy, showed in a typical manner the extreme irregularity of the syphilitic liver. De Renzi ⁵⁹⁶_{June, '94} relates a case of gumma of the liver with perihepatitis in a man, 24 years of age, who probably had a form of what may be called "ignored syphilis." He had been fed by an unhealthy wet-nurse and had subsequently suffered from glandular swelling at the elbow. The syphilitic nature of the hepatic affection was confirmed by the rapid improvement which took place under the specific treatment. Ferrara ⁵⁷_{June 17, '94} relates a case in which the diagnosis of circumscribed syphiloma at the hilus of the liver was possible. Mercurial treatment was followed by complete recovery.

Movable Liver.—Cases of movable liver are referred to by

Mathieu, ¹⁴_{Oct. 22, '93} Godart, ⁸⁶⁸_{Jan. 6, '94} Leube, ³⁴_{Jan. 23, '94} Dobrzycki, ⁵⁷_{Feb. 4, '94} ⁵⁵¹_{No. 1, '94} and Gortscharenko. ⁵⁸⁶_{No. 44} ²¹_{Mar. 10, '94} Leube remarks on the rarity of this condition, and on the ordinary causes (loosening of the ligaments attaching it to the diaphragm), and says that an additional cause may lie in the loosening of its posterior attachment, for usually the vena cava is firmly bound to the liver and vertebral column.

Rupture of the Liver.—Cases of rupture of the liver are reported by Durante, ⁷_{No. 7, '94} Battle, ²_{May 12, '94} Wilson, ¹⁸⁷_{July, '94} and Hodenpyl. ⁵⁹_{Aug. 4, '94} All were followed by rapid death, although in Hodenpyl's case death did not occur for three weeks, and was then due to peritonitis and septic infection. Schmidt ⁹_{July 24, '94} relates the case of a woman in whom gall-stones had been diagnosed, who died after several gastro-intestinal hæmorrhages; upon post-mortem examination, a false aneurism was found involving a branch of the hepatic artery, rupture of which had caused death. In a case described by Battle, ²_{Apr. 7, '94} a boy, aged 6, having been run over by a hansom-cab, had but a slight shock and few definite abdominal signs for some days, when fluid appeared in the abdomen, and on the ninth day death supervened. At the autopsy the common bile-duct was found to be torn transversely completely through. The liver and gall-bladder were intact.

Angiocholitis and Cholecystitis.—Gilbert and Girode, ¹⁴_{Dec. 6, '93} recalling the fact that they had always reported a case of suppurative cholecystitis due to Eberth's bacillus, describe a second case, that of a woman, 40 years of age, who, during the course of a typhoid fever, had had a swollen liver. She recovered, but four months later suffered from hepatic symptoms. A diagnosis of calculous cholecystitis was made and cholecystectomy practiced. The gall-bladder was hypertrophied, and contained a large calculus and puriform bile, in which a pure culture of Eberth's bacillus was found. Upon the inner surface of the wall, which was thickened and rose-colored, was an embryonic layer, penetrating the substance of the muscular stratum. Upon its surface and in its interior the Eberth bacillus was found in abundance. Gilbert and Dominici, ¹⁴_{Dec. 27, '93} by injecting cultures of Eberth's bacillus into the ductus choledochus of rabbits, have been able to infect the bile, and thus give rise to well-marked angiocholitis and cholecystitis. They have also observed ¹⁴_{Jan. 17, '94} that the injection of cultures of the choleraic bacillus was followed by a most intense irritation of the

biliary passages, by a very active diapedesis of the white corpuscles, and by necrotic lesions of the hepatic cells. Such alterations correspond to those found in human cholera. Later on ¹⁴_{Jan 24, '94} they report three more cases of suppuration of the gall-ducts, attributable to the action of Escherich's bacillus. In one of these cases, cholecystotomy having been practiced, the bile was collected when the gall-bladder was opened; it contained some little clots of pus, cultures of which gave rise to the same bacillus. The frequency with which this micro-organism is found in cases of biliary suppuration, not only in anatomical specimens, but in the living subject, with the exclusion of any other microbe, permits of its being considered "as the great parasite of the biliary channels." In another set of experiments the same authors ¹⁴_{Feb. 23, '94} found that the injection of the streptococcus, pneumococcus, and staphylococcus aureus into the ductus choledochus is followed by the development of an angiocholitis, and especially of a choledochitis, which, by the formation of a viscid mucus wholly blocks up the terminal portion of the ductus choledochus, completely hindering the flow of bile and causing dilatation of the biliary passages and jaundice.

Pollaci ⁵⁸⁹_{Aug. 18, '94} describes a rare form of angiocholitis and peri-angiocholitis of the great intra-hepatic biliary channels, in which the phlogistic process had not uniformly attacked the walls of these channels, but was limited to single points, producing there villositities which gave to the channels an adenomatous appearance. Bacteriological examination showed these villositities to contain a remarkable number of microbes (cocci and short bacilli), found in the other parts of the walls. The peculiar characteristics of the phlogistic process were thus explained by the mode of invasion and proliferation of the microbes, which had not spread uniformly in the wall-structure, but had limited themselves to circumscribed spots, giving rise in their growth to the villositities.

Two cases of suppurative angiocholitis, in which the bacterium coli commune was found, have been reported by Dmochowski and Janowski. ⁶⁹_{May 24, '94} The absence of any other micro-organism and the experimental researches showing the pus-producing rôle of the bacterium coli commune led the authors to conclude that the suppurative inflammation of the biliary vessels in their cases was produced by this microbe.

Gall-Stones.—Brockbank ⁹⁰_{Nov., Dec., '93} contributes an article upon

the pathology, etiology, and treatment of gall-stone, in which he considers the formation and composition of these stones as they occur in man and the lower animals, and calls attention to the fact that the disease is quite frequent among the Anglo-Saxons, but very rare in Eastern countries. J. Mayer²_{June 30, '94} says that his experiments as to the pathology of biliary calculi point to the correctness of Naunyn's view, namely, that an unhealthy condition of the mucous membrane is a necessary antecedent to the formation of calculi in the gall-bladder. What part microbes may play in the production of gall-stones is, however, yet to be settled. The question was discussed by Gilbert and Dominici,¹⁴_{June 20, '94} who, having found microbes present in biliary calculi, especially in cases in which the lithiasis was of recent date, endeavored to verify experimentally the theory of microbic origin. They injected into the gall-bladder of three dogs cultures of Eberth's bacillus, and into the gall-bladder of one dog Escherich's bacillus. The first two animals succumbed to suppurating cholecystitis, pneumonia, and endocarditis; the other two were killed after some months, but examination showed nothing. The question, therefore, remains, as hitherto, unsettled, and the authors are now carrying on their experiments under different conditions.

Gerhardt⁶⁹_{Oct. 15, '93} calls special attention to the fact that at the commencement of an attack of cholelithiasis,—i.e., at a time when pain has not set in,—a tumor represented by the gall-bladder is tangible. This disappears directly the gall-stone reaches the intestine. The attack is now over, although the pain does not immediately subside. Not infrequently the pains are caused by slight circumscribed local peritonitis in the region of the gall-bladder, and may be lessened by ice-cold compresses. In cases in which the attacks are protracted the whole liver swells up, its edge being readily tangible and even visible in extremely-thin patients. It should, however, be borne in mind that this important symptom, swelling of the gall-bladder, may also be caused by occlusion of the common duct by ascarides, distoma hepaticum, or inflammatory exudations. It may also be caused by a tumor of the head of the pancreas pressing on the gall-duct. On the other hand, it never occurs in cases of cardialgia or purely nervous hepatic colic. Cholelithiasis may be safely excluded if, after many apparent attacks, no trace of stone can be detected in the feces, if no functional sounds

can be heard with the stethoscope in the neighborhood of the gall-bladder, or if the latter itself do not appear enlarged.

H. Price¹⁹_{Oct. 21, '94} reports a case of gall-stone complicated by gastric ulcer. Jayle⁷_{No. 20, '93} describes a case of biliary lithiasis in which a suppurative perihepatitis set in, followed by the formation of an hepato-bronchial fistula, rejection of biliary calculi through the bronchi, and death with uræmic symptoms. W. Russell³⁶_{Jan., '94} showed the Medico-Chirurgical Society of Edinburgh a gall-stone undergoing disintegration. On incising the gall-bladder it was seen to contain a small quantity of a slightly greenish-yellow, creamy fluid, while the solid contents consisted of a large, irregular calculus with uneven, fractured edges and surfaces and a mass of smaller fragments with sharp edges and points, evidently derived from disintegration of the larger mass.

Hepatic Colic.—Lépine²¹¹_{Feb. 18, '94} combats the usual theory that hepatic colic is always dependent on foreign bodies in the bile-ducts. He believes that it may be due to a simple spasm, and he bases his theory on three grounds,—1. Clinical proofs: Hepatic colic is common in cases of hysteria, where no gall-stone is present. 2. Proofs from pathological anatomy: Cases have been observed of jaundice and colics in which the only lesion found was contraction of the bile-duct. 3. Experimental proofs: Spasm of the lower part of the common duct can be set up in dogs, and Doyon has proved that reflex contraction of the bile-ducts can be excited by influences having their origin in the stomach.

Ouchterlony²²⁴_{Feb. 10, '94} observes that it is not very uncommon to find that patients suffer from repeated attacks of hepatic colic with or without jaundice, and that a most careful search fails to develop the presence of a gall-stone in the fecal evacuations. The condition must, therefore, be due to one of several conditions. Either the gall-stone is so large that (as in one of his cases) it cannot possibly pass out; or a gall-stone, though quite large, may enter the orifice of the cystic duct, giving rise to symptoms of gall-stone colic, but it soon drops back. He showed two specimens illustrating this last condition.

Destrée,⁸⁶⁸_{Oct. 21, '93} Atkinson,⁸¹_{Jan., '94} and von Schultz⁴_{Feb. 5, '94} confirm the favorable effects of olive-oil in hepatic colic. Dujardin Beaumetz⁵_{Sept., '94} objects, on the other hand, that it possesses the marked inconvenience of being repugnant to the patients, who experience

great difficulty in swallowing, at one time, the large amount (7 ounces,—217 grammes) which is required. Schultz has tried calomel with good results, and has found that its favorable action on gall-stones and diseases of the bile-duct is not due to an increase in the secretion of bile, but to its disinfecting properties, which rapidly change the composition of the bile, and thus diminish the abnormal irritation of the mucous membrane of the gall-bladder. Ferrand¹⁰⁰_{Sept. 4, '94} reports favorable results from the use of glycerin, administered by the stomach, whence it is rapidly taken up by the hepatic vessels. He believes that it exercises distinct cholagogue effects and tends to prevent hepatic colic.

Tumors of the Gall-Bladder.—Cases of primary cancer of the gall-bladder are described by Meunier,⁷_{No. 22, '93} Claisse,⁷_{No. 4, '94} and Coyne.¹⁸⁸_{Mar. 11, '94} In the first case the cancer co-existed with a biliary lithiasis, which probably had something to do with the development of the cancer, inasmuch as its previous appearance was shown by the hepatic colics from which the patient had long before suffered. Von Mosetig-Moorhof¹⁶⁹_{June, '94} operated upon a female patient affected with a villous cancer of the gall-bladder. After removing the cancerous lumps with the curette he introduced every second day a pencil of methylene-blue into the wound, and administered a daily dose of 0.60 gramme (9½ grains) of this substance, in pills. This treatment was followed, in a short time, by complete recovery.

Congenital Absence of the Gall-Bladder.—Eshner⁹_{May 19, '94} made a post-mortem examination on a colored child, 2 years old, who had presented no symptoms suggestive of any anatomical peculiarity referable to the biliary apparatus or to other structures, and who had died of broncho-pneumonia. Section showed that no gall-bladder existed, the usual fissure being wanting and nothing suggesting the previous presence of this viscus. The rarity of such a congenital absence of the organ in man renders this case of interest, although it is already well known that its absence is not incompatible with life.

DISEASES OF THE PANCREAS.

Pancreatitis.—A case of acute hæmorrhagic pancreatitis is described by W. E. Paul.⁹⁹_{Jan. 4, '94} A robust man, aged 62, who had for many years suffered from recurring intestinal symptoms, was

taken with symptoms which led to the belief that there was an obstruction of the bowel, with perforation. The death, thirty hours after the beginning of the attack, was apparently typical of acute peritonitis. A partial post-mortem examination was granted. The abdomen was opened, and the omentum was found to be adherent from old peritonitis. The intestines were everywhere free and showed no sign of peritonitis. A soggy, heavy, enlarged pancreas was discovered, of a dark-red color; the organ was apparently loaded with blood.

Hæmorrhage.—Nimier⁹²_{May 10, '94} discusses this subject and gives illustrative cases. By the term "pancreatic apoplexy" is understood a spontaneous effusion of blood into the gland, with or without effusion into the neighboring cellular tissue. Pancreatic hæmorrhage should be thought of if symptoms of peritonitis develop without obvious cause, or simulate biliary colic, no hepatic symptom having been previously noted. It usually occurs in fat persons or in the subjects of arterio-sclerosis. The treatment cannot be very satisfactory; even local intervention must be quite empirical, owing to the difficulty of diagnosis and want of knowledge as to the physiological pathology.

Necrosis.—John Lindsay Steven,⁶_{Apr. 14, '94} in relating two cases of pancreatic disease associated with multiple necrosis of the abdominal fat, formulates the following conclusions: 1. In fat-necrosis and necrosis of the pancreas we have two distinct and independent lesions,—*i.e.*, the one may exist without the other. 2. If fat-necrosis be very extensive, it may lead, by confluence, either to localized or complete sequestration of the pancreas, and the two cases recorded may be looked upon as illustrating different stages of the same process. It is necessary, however, to place pancreatic necrosis arising from this cause in a category by itself. G. S. Middleton²¹³_{Aug., '94} describes a case of necrosis of the pancreas with cystic formation and fat-necrosis.

Abscess.—Macaigne⁷_{No. 12, '94} relates the case of a woman 30 years old, treated for a tubercular peritonitis, who showed only, as the main symptom, an epigastric pain. The patient died from an infectious broncho-pneumonia. Post-mortem examination showed general peritonitis and multiple abscesses of the pancreas, one of which was seated in the head. Cultivations of the pus gave almost pure cultures of the pneumococcus.

Pancreatic Colic.—Holzmann³⁴_{May 15, '94} gives the history of the following case: A man, aged 69, had, two days after admission, severe pain in the left hypochondrium, radiating at times to the right. Salivation followed. Distinct traces of sugar (not maltose) were found in the urine passed during the attack. The attack recurred, being sometimes abortive, in which case there was no glycosuria and no salivation, and sometimes severe, when it was accompanied by salivation or by glycosuria, or by both; fever was also observed. No concretions and no real excess of fat were found in the stools. The co-existence of these three symptoms was striking and made the diagnosis certain. The salivation was due to the pancreatic colic, and not to the presence of vomiting nor any gastric affection. Injections of pilocarpine gave good results.

Minnich⁴_{Feb. 19, '94} relates the case of a man, 68 years old, who was subject to attacks of hepatic colic, followed each time by the expulsion of typical calculi of cholesterin. After a time the character of the colic had changed, the pain under the left ribs and in the epigastrium having spread to the shoulder-blade; there was no icteric coloration, the stools remained colored, and the urine contained no biliary pigment. A daily examination of the stools made during the last attack revealed concretions and small calculi of a peculiar character. They were very malleable and easily crushed between the fingers, and presented a smooth surface on being cut. They contained no crystals nor morphological substances; they dissolved in chloroform, and, after combustion, left a residuum containing acid carbonate and acid phosphate of calcium. According to the author, these characteristics sufficed to distinguish the calculi in question as the second variety of pancreatic concretions. They might be taken for intestinal calculi, but the concomitant existence of colic confirmed the diagnosis of their pancreatic origin.

Atrophy.—A case recorded by Lichtheim⁴_{Feb. 19, '94} is of much interest in connection with the diagnosis of pancreatic affections. The patient fourteen years before had been suddenly seized with severe colic, which recurred at intervals for six years, being accompanied by fever and vomiting. He remained afterward in good health until about one year before admission, when obstinate diarrhoea set in, with accompanying emaciation and increase of hunger and thirst; at the same time the weakness became more

marked. On admission there was diabetes with moderate polyuria. Death followed rapidly-advancing pulmonary tuberculosis. Post-mortem examination showed tuberculosis of both lungs; the pancreas was cirrhotic and there was advanced atrophy of the glandular parenchyma. Lichtheim gives the following grounds for his diagnosis, made during life: (1) the severe colic with violent epigastric pain, vomiting, and fever; (2) the occurrence of diabetes several years later; and (3) the peculiar diarrhoea, which presented certain resemblances to the fatty stools of pancreatic disease. Fleiner⁴_{Jan. 1, '94} discusses the relation of diabetes to pancreatic cirrhosis of calculous and arterio-sclerotic origin. He emphasizes Minkowski's statement that diminished function on the part of the pancreas may produce slighter forms of diabetes. He relates a case of severe diabetes in a man, aged 40, in whom cirrhosis of the pancreas was secondary to calculi. A second case is also recorded, in which the pancreatic disease seemed to be due to arterio-sclerosis. Arterio-sclerotic changes may induce cirrhosis in the pancreas, as in other organs, and when a large part of the pancreas has disappeared diabetes may be produced.

Cysts.—Durante⁵⁸⁹_{Nov. 6, '93} operated upon a case of pancreatic cyst in which Wirsung's duct was found occluded by an ascaris lumbricoides. This occlusion had produced a stasis of the pancreatic fluid with softening of the parenchyma. The patient died. W. J. Mayo⁵⁹_{Feb. 10, '94} opened and drained a cyst of the pancreas, healing following in five weeks. Churton²_{June 2, '94} relates a case of pancreatic cyst with diabetes, and considers aspiration preferable to incision in cases associated with glycosuria.

Cancer.—Claisse⁷_{No. 1, '94} relates the history of a patient who was seized with biliary retention complicated by infection, and who died with symptoms of icterus gravis. The autopsy showed that there was a cancer of the head of the pancreas obstructing the ductus choledochus and involving the gall-bladder. Bernard⁷_{No. 3, '94} showed the abdominal organs from a case in which during life several errors of diagnosis had been made. Numerous nodules of secondary cancer were found in the liver, and the absence of the symptoms of pancreatic disease was explained when it was discovered that the cancer had had as its initial seat the tail of the pancreas. Another case of this kind is described by Ranglaret.⁷_{No. 16, '94} No special symptoms had been observed during life. The autopsy

showed a cancer of the head of the pancreas. Auvray ⁷_{No. 18, '94} relates a case in which a primary cancer of the pancreas had not been diagnosed during life. Secondary cancers followed in the liver and lungs, which showed gangrenous phenomena. J. S. Ely ⁵⁹_{July 21, '94} relates a case with symptoms of a carcinoma in the substance of the liver. At the post-mortem examination numerous cancerous masses were found in the mesentery and through the liver. Around the common bile-duct was a hard mass, which replaced the substance of the pancreas. Flexner ⁷⁶⁴_{Jan., Feb., '94} relates a case in which the presence of a large firm tumor in the upper umbilical and lower epigastric regions, together with jaundice, distension of the abdomen, etc., led to the diagnosis of probable carcinoma of the pancreas with secondary involvement of the gall-bladder and stomach. The autopsy confirmed this diagnosis, and on microscopical examination the tumor of the pancreas proved to be a typical carcinoma. Courmont and Bret, ⁹⁹⁶_{Sept. 10, '94} in giving the history of a case, emphasize the statement of Mirailhé, who assigns to primary cancer of the pancreas two stages: a first, characterized by glycosuria with symptoms of wasting diabetes and steorrhœa; and a second, in which there is no glycosuria, but icterus and cachexia.

CHOLERA; DISEASES OF THE INTESTINES AND PERITONEUM.

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CHOLERA.

General Literature.—Kemp¹⁵⁷ July, Aug., '94 reviews the entire subject of cholera, its etiology, pathology, and treatment, quoting largely from German authors. Korber, Weidenbaum, Kieseritzky, and Graubner²¹ Nov. 11, '93 describe the epidemic at Dorpat. The first cases observed were obscure and did not permit of a certain diagnosis. In succeeding cases the symptoms were more characteristic and the vibrios were found in the stools. The first patients had not been outside of Dorpat; so that the disease must have been brought in by some traveler, who, perhaps, was suffering with apparently only a diarrhœa. The epidemic had, at the time of writing, been confined entirely to one district of the city, in which the sanitary conditions were very imperfect and the inhabitants very poor. It seems probable that the spread of the disease was partly through the drinking-water, although there were many evident cases of direct infection. Another interesting feature was the absence of cases of so-called cholérine. The writers explain this on the theory that all such cases were concealed and only the severe ones reported to the authorities. In the line of treatment particular attention was given to the destruction of the dejections and the vomited matter. The patients were also removed to the Cholera Hospital and the dwellings thoroughly disinfected throughout. Von Esmarch⁶ Jan. 27, '94 describes an outbreak at Tilsit in one house. There were 17 cases, with 8 deaths; but the spread of the disease was prevented. Kluezenko and Kamen⁵⁰ Aug. 11, '94 report cholera in Bukomina in 1893, and Chantemesse an outbreak in Constantinople from August to December, 1893. There were 2000 cases with 1100 deaths. After

heavy rain-storms the epidemic had quite marked exacerbations. Dietetic errors in many cases predisposed to the attacks. As the people began to boil the water more and more the disease declined.

L. Pawlowsky ²¹_{June 9, '94} observed an epidemic on a Russian war-ship while sailing from Batoum to Sebastopol. There were 20 cases in all, 1 of which was fatal, and the stools of this one contained the cholera bacillus. The source of infection could not be discovered. L. W. Darra Mair ²_{Nov. 25, '93} reports a fatal case occurring at Mitcham, England, in which the symptoms appear to have been quite characteristic. The diagnosis was confirmed by a bacteriological examination made by the Local Government Board. It was found impossible to trace the source of the disease.

D. Shbankow ²¹_{May 19, '94} states that, from May to September 4, 1892, there were 433,643 cases in Russia, of which 49.6 per cent., or 215,157, died. From January, 1893, to the end of October there were 94,748 cases, with 38,922 deaths,—41.07 per cent. In earlier epidemics the first year was always milder than the second. The famine of 1891 might explain the severity of the outbreak in 1892. Meteorological conditions seemed to have an influence; in southern Russia, with a temperature from 45° to 51° F. (7.3° to 10.5° C.), the mortality was 49.2 in 10,000 of population, 29 in central Russia, and 13.7 in the northern part. Clemow ²_{Mar. 10, '94} finds a reason for the severity of the disease in the customs of the classes affected in Russia. Rumpel, of Hamburg, ⁴_{Aug. 6, '94} in reviewing the cholera in Hamburg in 1893, states that there were 151 cases, and bacteriological investigations were made in all. The vibrios were present in every case. The first culture was gelatin plate; if in twenty-four hours this showed colonies growing in the typical manner, there were made (1) a gelatin stab-culture; (2) an agar culture for experimenting on guinea-pigs; (3) a peptone culture for the cholera-red reaction. Bourdon ¹⁹⁵_{Jan., '94} observed epidemics in the Islands of Molène and Trielen in 1893. In the former, with a population of 580, there were 44 deaths; in the latter, with a population of 23, 14 died. Alcohol is used habitually to excess in both islands. Boucek ⁵⁰_{Aug. 11, '94} gives a general view of cholera in Podebrad and the neighborhood, where epidemics occurred in 1836, 1849, and 1866. He adopts Pettenkofer's theory as to the origin of the disease.

Out of 122 cases of suspected cholera seen by Renvers ⁵⁰_{Mar. 24, '94} the diagnosis was confirmed in 13 by the presence of the comma

bacillus in the stools; 4 of these died, 1 was very sick, 5 had slight diarrhœa, and 3 had no symptom except the presence of the comma bacillus in the stools. There were 7 cases, 2 of which were fatal, which did not show the bacilli in the stools, but which could not be distinguished otherwise from true cholera. The origin of 9 cases was undoubtedly the water of the river Spree. One case developed in a physician assisting in the bacteriological examination. Koch's methods were verified, and the earliest detection of the vibrios was made in the peptone solution in five hours, the latest in sixteen hours. Mairêt and Bosc³¹_{Dec.20,'93} publish a clinical and experimental study of an epidemic of cholera. From the clinical symptoms the following different stages were recognized: prodromal, initial, stadial (with its different forms,—gastro-intestinal, asthenic, etc.), reactionary, and convalescent. The bacteriological investigations pointed to the cholera bacillus as the specific agent of the disease, and showed that it acted in two ways,—by direct injury to the intestine and by elaboration of a toxin which entered the circulation. Therapeutically, intestinal antiseptics were without effect, but in fulminating cases transfusion lowered the mortality from 95 per cent. to 50 per cent.

Fürbringer¹⁴_{Dec.17,'93} reported 5 cases of cholera occurring in the hospital at Friedrichshain; 2 of these contracted the disease apparently by contact with the dejections of a case of cholera. The 3 remaining cases were members of a family in which 6 cases in all occurred. The 3 others were those referred to by Renvers.⁵⁰_{Mar.24,'94} The origin of the disease in this family could not be discovered. The symptoms in all 5 cases were classical except that in one instance the passages were bloody, and in this patient the mucous membrane of the rectum was found to be necrosed and ulcerated. The bacilli were present in all instances, being recognized only after fifteen hours in 1 case. The writer claims that without the cholera bacillus there can be no cholera, though he admits the influence of other factors in the production of infection. H. J. M. Watts²_{Oct.7,'93} reports, in detail, 27 cases of cholera treated at the Fever Hospital at Great Grimsby, 6 of which died. The low axillary temperature and the slowness of the pulse-rate were two noticeable features of convalescence. C. B. Turner²_{Oct.28,'93} reports several cases occurring at Grimsby, the sanitary conditions being very bad in some instances.

In discussing Fürbringer's and Renvers's papers Leyden ⁶⁹_{Jan. 11, '94} called attention to the better results of treatment in the last epidemic, due to the existence either of a milder form of the disease or of better therapeutics. He favors the use of calomel, external warmth, and wine. Early diagnosis is an essential feature. He does not think that there is a wide difference between cholera nostras and Asiatic cholera. He has seen, in a fatal case of the former, where no bacilli were found, coagulation necrosis in the kidneys, which he holds is, though not constant, characteristic of true cholera. The theory of the absorption of a cholera toxin does not explain so well the clinical symptoms and pathological changes as does the mechanical abstraction of so much water. That the heart is not affected, as it is in the other infectious processes, is shown by the force of its beat and by the improvement of the pulse after intra-venous injections.

Etiology and Pathology.—C. II. II. Spronck ⁵⁸³_{V. 2, No. 20, '93} made comparisons of cultures of vibrios from different samples of water with others of undoubted cholera bacilli, using different methods of culture and making different experiments upon animals. In five out of eleven samples of water there were found vibrios which, as far as cultures were concerned, could not be distinguished from genuine cholera bacilli; while experiments on animals showed that some of them were toxic, although the effects produced were not the same. He concludes that they are identical with the cholera bacilli, and shows that the latter, cultivated directly from choleraic stools, are capable of minor modifications; and he intimates the possibility of the identity with the germ of cholera of all the different varieties of pseudocholera bacilli which have been described. Blachstein and Zumft ¹²⁶_{July 15, '94} found, in the cholera cases observed by them in Bakou and Astrakhan (1892), three bacilli which are not present in the intestine normally, which they call *Bacillus a*, *Bacillus b'*, and *Bacillus b''*, and which they regard as taking part in the etiology of cholera, although secondary in action to the cholera bacillus.

Hehir ²³⁹_{Oct. 1, '94} attributes the failure of treatment to a wrong idea of the cause of the disease, having observed, in the stools of cholera patients, an animal parasite which he calls the *Hæmatozoön choleraica humani*. Rosanow ²¹_{Aug. 11, '94} adheres to Bryden's theory of cholera as a miasmatic disease. Kutscher ⁶⁹_{No. 49, '93} in the course of

some investigations on water-vibrios, discovered that certain cultures from water and others from the faeces of healthy or very slightly sick individuals had a distinct green-white phosphorescence. On the other hand, he has never been able to discover any phosphorescence on cultures from cholera patients, and he has never heard of any investigators who have reported such a phenomenon. He also found that the phosphorescence was not affected by diffuse daylight and little by temperature, and that it was present after re-isolation of the germs from inoculated guinea-pigs. It ceased to appear with anaërobic cultivation.

Blachstein²¹_{Jan. 27, '94} reviews the theories regarding the course and nature of cholera, and refers to his own experiments in drinking cultures from the Seine water during the epidemic resembling cholera which occurred in Paris in 1892. He concludes, from this and other similar experiments, that the activity of the bacilli in the case of men is not parallel to their virulence in animals. He agrees with Pettenkofer, that the course of epidemics cannot be attributed alone to the biological characteristics of comma bacilli, and believes it very probable that the symbiosis of the comma bacilli with other species of micro-organisms found in the dejections and in the intestines of cholera patients plays an important rôle. O. Liebreich⁴_{No. 28, '93} reviews the various methods recommended by Koch for the recognition of the cholera bacillus, and concludes that, even with the greatest care and the most accurate knowledge of the subject, it is often impossible to come to a positive result. He believes that the cause of the disease is not the comma bacillus, but some unknown noxious principle. Denys, of Louvain,⁵²_{Mar. 24, '94} communicated to the Belgian Royal Academy of Medicine his investigations on sixteen cases of cholera occurring in St. Trond in the winter of 1893-94, and made special reference to his rapid method of diagnosis. Stained microscopical specimens were conclusive in but two of the cases, while in all of them he was able to make the diagnosis by examining a fresh preparation and observing the characteristic rapid movements of the vibrios. These vibrios, in every case, responded to all of Koch's principles except the cholera-red or indol-nitroso reaction, some of them not responding at all and others only after thirty-six hours instead of after eight hours. A certain amount of skill is necessary to recognize the characteristic movements. The committee appointed by

the academy to examine the work could not, from their own experiences, agree with the speaker as to the value of the movements of the vibrios for diagnostic purposes, nor could they accept as unessential the irregular cholera-red reaction. D. Zabolotny ⁶⁹_{Dec. 21, '93} discusses in detail the various methods in use at the bacteriological station in Odessa. Through the combination of all of them he is able to obtain a pure culture of the cholera germ in fifteen hours, and often to make the diagnosis in five or six hours. De la Croix, ²¹_{Jan. 27, '94} as a result of bacteriological studies on the fœtuses of cholera patients, discovered the bacilli in the liver and spleen of one case and in the gastric contents of a second. Cultures from the gastric contents of a still-born child from a choleraic mother showed comma bacilli. These cases appear to prove that the germ circulates in the blood of the mother and can be transmitted to the fœtus. Thomas ²⁷³_{V. 22, No. 1, '94} succeeded in producing in rabbits all the symptoms and pathological lesions of cholera by giving intravenous injections of cholera bacilli. In every instance he obtained nearly pure cultures from the fœces. If the animals received doses of absolute alcohol for two days before the injections, the predisposition to the cholera infection was very greatly increased.

A. Stutzer and R. Burri ⁵⁸_{B. 14, '93} conducted a series of experiments upon the bacilli of cholera with reference to the influence of alterations in the culture-medium on their growth. They found that a distinct degree of alkalization was necessary for their best growth, while nearly neutral media were very unsuitable. Sulphuric and phosphoric acids were decidedly inimical to the development of the germs. The writers, therefore, recommended much-diluted sulphuric acid as a disinfectant in this disease. Saltykow ⁵⁸⁶_{No. 6, '93} studied the inhibitory influence of iodoform vapor upon the growth of cholera bacilli, and found, contrary to the conclusions of Bujwid, that the bacilli of Finkler-Prior, Miller, Deneke, and the vibrio of Metchnikow were influenced by it just as the cholera germs were, and that this supposed differential test cannot, therefore, be relied upon.

R. J. Beck ¹²³_{Dec. 18, 25, '93} reviews the published experiments of Emerich and Tsuboi upon cholera as the result of nitrite poisoning produced by the bacilli. Assuming the truth of this theory, more than one cause must act to produce cholera. Not only are the bacilli necessary, but the nitrates also, upon which they are to act

to produce nitrites. The presence of carbohydrates is a further essential. This throws a new light upon the prophylaxis. We must see that the drinking-water is not only without bacilli, but that it contains no nitrates. This can be more readily managed than the procuring of food free from nitrates. So much vegetable food contains more or less of this substance that in cholera times the only diet completely free from danger is one consisting purely of meat. Indeed, even though nitrates enter the system with the water, a meat diet would fail to supply the carbohydrates which render cholera possible. If these precautions are followed, isolation of patients and limitation of social intercourse is unnecessary. The author further claims that it is very important that the general health and nutrition of the population be cared for, and that money spent in this way will do more to prevent the beginning of cholera than that expended in quarantine, disinfection, and the like. De Vestea, of Pisa, ⁶_{Apr. 14, '94} states that in two cases of malignant cholera he was unable to find methæmoglobin, thus opposing Emmerich's and Tsuboi's theory. The comma bacillus not only could reduce nitrates, but also could separate acids from the carbohydrates; and, as nitrites in an acid medium become more toxic, there was probably a local action with necrosis of the intestinal epithelium and paralysis of the small vessels, thus causing a choleraic diarrhœa which was followed by true cholera. The predisposition of the poorer classes may thus be explained by their more strictly vegetable diet, which supplies a greater amount of nitrates. Tsuboi, in this connection, ⁵⁰_{May 1, '94} states that the report by Emmerich and himself, that methæmoglobin must be found in every case of cholera, will have to be modified. He has found that 1 gramme (15½ grains) of nitrite must exist in the blood before the spectroscope will reveal methæmoglobin, and often the individual will succumb to a smaller amount of nitrite.

Friedrich, ⁵⁰_{Mar. 24, '94} as a result of investigations on the vibrio of Asiatic cholera, with special reference to its recognition, concludes that there are not different species of the true cholera vibrio, but that the changes which occur when it is grown under different circumstances are not constant and are unessential, the typical forms being obtained again from the changed ones. The red reaction on the addition of acid is diagnostic, and can be distinguished, in point of time, from that given by Finkler-Prior's,

Miller's, and Deneke's microbes, and, by the shade, from Metschnikoff's vibrio. He ⁵_{Mar., '94} has studied the life of the bacillus on the various food-stuffs, its duration on the outer surface of fruits and vegetables being from one to six days, while on the cut surfaces it ranged from one hour (on very acid fruits) to two weeks.

Sanarelli ²⁶²_{Oct., '93} studied the vibrio forms especially, and found that they had the reactions and pathogenic properties of the cholera vibrio, but were morphologically distinct. He suggests that these are descendants of true cholera vibrios from former epidemics, living as saprophytes and waiting until conditions of which we are now ignorant arise, when they become virulent. Wiltshur, ²¹_{May 19, '94} in microscopical preparations from single colonies, found in every case little rods the ends of which stained more strongly than the centre. From these, when cultivated, grew the comma bacilli of typical form. He does not consider them to be an involution stage of the cholera vibrio, but only a form modified by the influence of climate and culture-medium. He thinks that they explain the varied results of different observers, and himself subscribes to the specific etiology of cholera,—the comma bacillus.

A. Draer ⁵_{Mar., '94} found, in purely bacteriological examinations, that the sozoiadol preparations are far superior to tribromphenol-bismuth as disinfectants against the cholera bacillus. Freymuth, of Danzig, ⁶⁹_{Aug. 9, '94} concludes that formalin is only of moderate efficiency, acting very slowly and not thoroughly. G. M. Vlaieff, of St. Petersburg, ⁵⁸⁶_{No. 33, '93} recommends boiling water as the most effectual, rapid, cheap, and convenient method for destroying the comma bacillus. Forster and A. H. Nijland ¹²⁶_{July 15, '94} investigated the life of the vibrio in water used for bathing purposes. Soap is toxic toward them in a 0.2-per-cent. solution. No cultures could be obtained after a bath with sublimate soap in water which had been artificially infected with comma bacilli before the bath. Renk ¹²⁶_{July 15, '94} has found that the comma bacilli cannot survive in ice longer than five days. According to A. Montefusco, a temperature of -10° C. (14° F.) for one-half hour will destroy the pathogenic properties of vibrio cultures without affecting vitality further than to temporarily check their growth. A. Stutzer and Burri ⁵⁸_{B. 14, '93} found that the vibrios lived for twenty-one days in bottled water taken from the Rhine. G. Palermo exposed cultures to direct sunlight for six or seven hours, the vitality and virulence being thereby diminished, but not de-

stroyed. A. Pick ³²⁴_{B.19, II.1, '93} made some interesting experiments upon the influence of wine and beer on the cholera germ. Water laden with these germs may be drunk without danger after it has been mixed with wine in the proportion of 1 to 3 and allowed to stand five minutes. Beer also was found to kill the bacilli in from five to ten minutes, death being due to the acid and not to the alcohol.

Gruber, of Vienna, ³⁴_{May 29, '94} found that the only reliable means of distinguishing the cholera germ from other vibrios was in the gelatin plate culture, when the cholera vibrios could be recognized by their irregular colonies, which appeared granular and fissured in the upper layers and granular and wavy in the lower. The microscopical examination and the nitroso-indol reaction cannot distinguish absolutely the different vibrios.

Radecki ²¹_{Feb. 17, '94} calls attention to the fact that very severe and even rapidly-fatal cases of cholera occur with all the characteristic symptoms of the disease, yet careful examination fails to show bacilli in the stools; and that, on the other hand, cases which are clinically identical with mild diarrhœa may yet have abundant bacilli in the discharges. A. Lazarus ⁶_{Dec. 23, '93} reports a case of laboratory cholera in an assistant in the Moabit Hospital. The blood of the patient was found to have its immunizing power increased from 1:250 to 1:330,000. Another writer ²²_{Sept. 5, '94} states that the first case of the kind occurred in Berlin in 1886, the second in Danzig. The effects produced on Pettenkofer and Emmerich by drinking cultures are classed as laboratory cholera. Pfeiffer and Pfuhl were accidentally inoculated with cultures and had moderately-severe attacks of the disease. The bacilli were found in Pfeiffer's discharges for thirty-three days. According to Koch, the comma bacilli may be able to spend the winter in the intestinal tract of the host. A practical application may be drawn from this as regards preventive medicine. Karlinski ⁵⁰_{May 19, '94} studied 293 cases of cholera in Arabia and found comma bacilli in 280. He discovered them in his own stools, also, without having any of the symptoms of cholera. Possibly his immunity is the result of the attack of cholera he experienced in 1892. His bacteriological investigations gave as results: Pure cultures of the comma bacillus in 81 cases; the comma bacillus with the colon bacillus in 97 cases; the comma bacillus, the colon bacillus, and

the bacillus proteus 110 times; so that Nencki's and Blachstein and Zunft's theory is contradicted, that three other bacteria combine in every case with the comma bacillus. Klein⁵⁰_{May 17, '94} reported a small epidemic in England, the bacilli being found in 30 out of 55 cases. He considers the presence of the bacillus pathognomonic of cholera; but when they are not found he does not assert that the case is not Asiatic cholera, thus not attaching so much value to negative results as Koch does. Aufrecht, of Magdeburg,⁵⁰_{Mar. 24, '94} reports a fatal case of suspected cholera in which the cholera vibrios could not be found, but, instead, spirilla in vast numbers, staining like the spirillum of relapsing fever.

H. S. Beadles⁶_{Oct. 28, '93} reports two cases of what were suspected to be cholera. Both terminated fatally, and in one, examined by Klein, cholera bacilli were found. Both patients were inmates of an asylum and had not been outside of it for a long time, nor had they had any communication with any region where cholera existed. The water-supply was good beyond question. The author holds that, except for the presence of the bacilli, there was nothing to distinguish these cases from cholera nostras. Heerwagen⁵⁸_{V. 15, No. 1, '93} describes the disease as it occurred in Riga in 1892. There were 129 cases among 210,000 inhabitants. The state of the ground-water and meteorological conditions were shown to be without influence, but the condition of the water-supply was proven to be of the greatest importance. The disease spread evidently from a ship and infected others lying near by and using the water surrounding them for drinking purposes. As soon as the use of the water was forbidden to the ships, cases ceased to appear among the sailors. In another instance workers in a cement-factory were attacked, and it was found that they procured their drinking-water from the neighborhood of an infected vessel. In a large number of other cases the disease could easily be traced to its use, though comma bacilli could not be found in the water. In a quarter of the cases the disease seemed to have arisen through direct infection from person to person. Korber, of Dorpat,²¹_{Sept. 1, '94} is of the opinion that the cholera epidemic in that city was spread mainly by the water-supply. G. Borchow⁸⁵⁹_{No. 7, '94} showed the relation of the number of cholera cases in Wasili-Ostrow to the two sources of water-supply during the outbreak. That used during the first month, producing 173 cases, was taken fifteen fathoms from the shore and

one and a half fathoms below the surface. The source was then moved to sixty-five fathoms from the shore and six fathoms below the surface, and in the next five months only 126 cases developed.

P. Hauser³¹_{June 9, '94} supports Pettenkofer's view of the important part played by the level of the ground-water in the cholera epidemic in 1892. By means of comparative charts showing the amount of rain-fall, the number of cholera cases, and the level of the ground-water he shows that as the ground-water sank cholera increased. The first case appeared in April, but it was not until July, August, and September, when the ground-water was very low, that the disease became epidemic. The rain-fall was very slight, except during the latter part of August, but the extreme heat overcame it, and the ground-water sank even lower. He is of the opinion that a polluted water-supply may aggravate an epidemic of cholera by furnishing a good culture-medium, and that a good water-supply may lessen an epidemic, but thinks that the theory of the spread of the disease by means of water is inadequate. Von Pettenkofer³⁴_{Mar. 20, '94} while accepting the vibrio as the cause of cholera, does not agree with Koch as to the mode of its transmission through the drinking-water, but adheres to the ground-water theory.

Drasche, of Vienna,⁴¹_{July 2, '94} claims that the results from drinking cultures of the vibrio can be produced by the cultures of other bacteria, especially of the streptococci. Hesse¹²⁶_{July 15, '94} states that distribution through the air, in accordance with Uffelman's experiments (see ANNUAL for 1892), must be regarded as of etiological importance.

Lachmann⁴¹_{Jan. 4, '94} analyzes the state of our knowledge regarding the causation of cholera, as shown by the epidemic of 1892-93. The history of this epidemic shows that the disease does not spread by means of contaminated rivers, since it extended from large cities rapidly toward the interior, in the direction opposite to the course of the stream. Neither did the contamination of drinking-water satisfactorily account for its spread. He believes that the dejecta contain cholera bacilli and the cholera contagium,—viz., the spores which are produced by the bacilli,—the latter being more tenacious of life than the bacilli, and also more virulent. The disease is spread by articles soiled by dejecta or by the diffusion of the dried pulverized dejecta through the air. Consequently,

cholera epidemics are most apt to arise in dry seasons. The contagium of cholera always enters the system through the digestive apparatus. These deductions teach us the great importance, from the stand-point of prevention, of bringing all dejecta and objects soiled by them under water as soon as possible.

Investigations as to artificial immunity have been made by Pawlowsky and Buchstab and Sobernheim.¹²⁶ July 15, '94 Voges⁵⁰ Aug. 11, '94 discusses the temporary immunity produced in the guinea-pig by injections of various bacteria other than the comma bacillus, and concludes that it is not specific. Issaëff,⁵⁸ Mar. 2, '94 as a result of extended and careful investigations in producing artificial immunity against cholera, draws the following conclusions: 1. That intra-peritoneal or subcutaneous injections in guinea-pigs of normal human blood-serum or of acid, neutral, or alkaline fluids produce a weak and transitory immunity, which cannot be confounded with the immunity which the products of the vibrio produce in guinea-pigs. 2. While guinea-pigs may be given this immunity against vibrio cultures, they are not immune against the toxin, as their blood possesses no resisting power to toxins. 3. The blood of immune guinea-pigs possesses, to a certain extent, curative properties in other guinea-pigs, after inoculation of the latter with vibrio cultures. 4. In men convalescent from cholera there arises in the blood, after the third week and lasting for two or three months, a peculiarity like that in the blood of immunized guinea-pigs. 5. The cell-reaction, as expressed by phagocytosis, plays the most important part in protecting guinea-pigs immunized by injections of bouillon cultures of other bacteria than the comma bacillus. 6. Phagocytosis also plays an important part in the immunity produced by the vibrio products, but other factors must also enter in, as the resistance in this case is much greater than that produced by other fluids, as mentioned above. The ability to furnish a specific immunity can thus be of use to distinguish between the comma bacillus and other vibrios. Metschnikoff¹⁴ Sept. 9, '94 assigns considerable value to the presence of other microbes in the intestinal canal, some of which favor while others retard the growth of the vibrios. The preponderance of the one or the other decides largely the condition of immunity or receptivity. Rasch, of Bangkok,⁴¹ Feb. 8, '94 gives an historical sketch of cholera in Siam, and concludes that the people are now practically immune against it.

Ketscher²¹_{May 9, '94} found that specific immunity against cholera could be produced in twenty-four hours in animals, and that it would last about three months; but that it was not absolute, as it could be overcome by large quantities of a virulent culture. In an immune animal the vibrios were destroyed by a ferment derived from the mononuclear and polynuclear and pseudo-eosinophile leucocytes. The only method to be thought of for immunizing human beings is *per os*.

Klemperer, of Berlin,⁶⁹_{May 17, '94} investigated the natural immunity against cholera which, according to Koch, exists in half of the human race. The acid gastric juice was supposed to be the only protection of the system, but Pettenkofer's well-known experiment on himself proves that there is something else. Experiments on guinea-pigs, rabbits, and dogs showed that the normal intestine is strongly resistant to the cholera bacillus. The blood-serum possesses a slight resisting power, but this is inferior to the barrier which exists in the nuclei of the epithelial cells in the form of a nucleinic acid (*nucleinsäure*), as shown by different stains and by the reactions of nuclein, which can be isolated. The exact way in which this acts is not yet clear, but he believes that the toxin generated in the intestinal canal by the vibrios of cholera becomes changed by the nuclein, during absorption, into an immunizing substance or antitoxin. It is a peculiarity of the living cell to be able to preserve a free acid in an alkaline medium. When the life of the cell is destroyed the barrier is removed to the entrance of the cholera bacilli. L. Vincenzi⁴⁶⁰_{p.137, '93} made cultures of comma bacilli from a case in Vienna, which proved very toxic to guinea-pigs and pigeons. Guinea-pigs developed a certain degree of immunity through the injection of sterilized or filtered cultures, and the serum of these immunized animals not only destroyed the comma bacilli completely, but conferred immunity on normal individuals when injected into their circulation. This immunity, however, lasted but a short time.

Ketscher²⁷³_{Nov., '93} discovered that the milk from an immunized goat had the property of conferring immunity to cholera, but not when introduced into the system by way of the stomach. It conferred immunity at once, but was of no avail if given shortly after the injection of the cholera germs. A temperature of 70° C. (158° F.) made the immunizing power much feebler and boiling

destroyed it entirely. The milk-serum possessed the same properties as the milk. Cholera vibrios developed well in the milk. The proportion of antitoxins in the milk increased with each injection, but diminished in proportion to the length of time which elapsed after an injection. The goat may succumb to an injection of cholera vibrios even when its milk contains a considerable proportion of antitoxin.

A. A. Kanthack and F. F. Westbrook ²⁶_{Oct. 2, '93} publish a long series of careful experiments with different forms of micro-organisms, including the cholera vibrio, with relation to the difference between "intra-cellular" and "metabolic" poisons of different bacteria as described by Klein. They conclude, from their own observations and those of others, that, as far as the cholera bacillus is concerned, (1) any one mode of immunization will protect an animal against an infection by any other form of inoculation used; (2) the serum of an animal immunized by any one method also protects guinea-pigs against an infection by any one of the various forms of inoculation; (3) the distinction between an "intra-cellular" and a "metabolic" poison in their relation to artificial immunity must not be made too narrow. S. Fedoroff ⁵⁸_{Dec. 30, '93} made an extended series of experiments with the blood-serum therapy of Asiatic cholera, rendering rabbits immune through the injection of cholera antitoxin into the peritoneal cavity and then using their blood-serum in the effort to render animals of other species immune. His experiments succeeded entirely. He did not succeed, however, in curing, with the inoculations, animals already sick with cholera. He refers to the investigations of Pawlowsky and Buchstab, who did succeed in this effort, and thinks that perhaps their cultures were less virulent. He was struck by the rapidity with which animals could be made immune. Even after they have been infected with a virulent cholera culture, but before symptoms have developed,—*i.e.*, during the period of incubation,—it is possible to establish immunity. J. Sawtschenko and D. Sabolotny ⁸⁵¹_{v. 2, No. 16, '93} made some experiments in the immunization of men against cholera. They employed for vaccination specially-prepared sterilized agar cultures of the microbe and found that immunization could be produced in this way, and that the swallowing of virulent cultures was without danger, although virulent bacilli were obtained from the stools. Very small quantities of

the blood-serum of the immunized persons sufficed to protect guinea-pigs inoculated with it. These experiments would seem to prove that persons appearing healthy may act as agents in disseminating the disease, since the bacilli may be present in the feces and yet give no sign.

R. Pfeiffer⁵⁸_{Mar. 2, '94} endeavors to reconcile the various divergent views which have resulted from the studies of different observers. His further researches have but upheld the views which he has already published,—viz., that there are in the cholera vibrios distinctly-poisonous substances which are insoluble in the ordinary culture-media, but which are set free after the death of the bacilli in the bodies of guinea-pigs used for experiments, and which then act as paralyzants to the centres governing the circulation and the temperature. He reviews critically the opinions of those who deny the existence of a cholera poison and of those who, admitting its existence, yet claim that it has no specificity nor importance for man; and he reports additional investigations of his own bearing upon this subject. His studies would lead him to conclude that, although the possibility of a successful protective inoculation against human cholera cannot be denied, the existence of such a possibility has not yet been proven experimentally.

K. Alt⁵⁰_{Aug. 11, '94} studied the effect of the cholera toxin on the nervous system and concludes that cholera is a poisoning by nitrites. Destruction of the nerve-elements was found, and punctiform hæmorrhages were seen near the origin of the vagus. Gruber, of Vienna,³_{Sept. 12, '94} does not think that a specific cholera poison exists nor that the conception of it is necessary to explain the symptoms; the mere presence and entrance of the bacilli are sufficient. Hueppe⁴_{Apr. 23, 30, '94} thinks that the cholera vibrio may vary in virulence in different conditions. He reviews very thoroughly the whole subject of a specific cholera poison, and is guarded in stating his opinion on the subject.

Denys and Sluys⁷⁹⁵_{V. 10, No. 1, '94} have ascertained that the toxins of cholera kill dogs when introduced into the pleura or subcutaneous connective tissue, but not when given by way of the stomach or intestines. The liver does not neutralize the toxin, since this is poisonous when injected into the portal circulation. They therefore conclude that the cholera toxin, like that of the colon bacillus, has no power to alter intestinal mucous membrane by attacking it

from without. It seems rather that the bacillus finds entrance into the interior of the tissues, develops there, and then attacks the intestinal mucous membrane, acting from within outward. It causes, in this way, a shedding of epithelium and throws open the door for extensive absorption. The writers claim that the nitrite theory of Emmerich and Tsuboi is not borne out by facts. Sluys ⁷⁹⁵_{v.10, No.1, '94} found that the virulence of cultures of cholera bacilli increased through sixteen inoculations in the rabbit, in which animal the lesions are the same after infection with the living bacillus as after intoxication with the toxin from dead cultures. By experiments upon dogs, which exhibit symptoms similar to those seen in men, he found that the cholera poison resisted a temperature of 100° or even 120° C. (212° or 248° F.). Its toxicity was not affected by exposure to light, to air, or to the gastric or pancreatic secretion. Finally, there was a marked parallelism between the action of the cholera toxin and that of the colon bacillus, and the author believes that the two microbes assist each other in producing cholera.

Pathological Anatomy.—Levine ¹⁰⁰_{June 26, '94} saw a cholera patient, while convalescing, suddenly attacked by fever, pain in the region of the gall-bladder, and signs of beginning peritonitis. Laparotomy showed a rupture of the gall-bladder. At the post-mortem examination a pronounced catarrh of the larger biliary ducts and of the bladder was found. D. A. Rusi ³¹⁷_{June 23, '94} studied the pathology of the female genital organs in cholera. There was always hyperæmia of the serosa, and sometimes hæmorrhage from the mucous surfaces. Microscopically, corresponding changes were found.—*i.e.*, dilatation of the blood-vessels with extravasation. Popoff ²⁰_{B.136, II.1} examined the central nervous system of two fatal cases of cholera and found apparently inflammatory changes affecting the vessels of the neuroglia and the nerve-elements themselves. Jerussalimsky ²¹_{May 19, '94} made sections of the skin from fatal cases of cholera and found the nuclei of the epithelial cells destroyed, or often a dropsical degeneration of the whole cell, which was swollen and transparent. This degeneration extended into the Malpighian layer also.

B. Pernice and G. Scagliosi, of Palermo, ⁵⁰_{June 16, '94} after a study of the renal changes pathologically and experimentally, consider the nephritis to be due to a toxin. Leyden ¹¹⁴_{B.22, p.1, '94} examined the kidneys taken from four cases dying at different periods. That taken

from a patient who died within twenty-four hours showed no lesion; the second, from a patient who had been sick three days, showed enlargement of the kidneys and coagulation necrosis of the epithelium, but no inflammatory action. In the third specimen, from a patient whose illness had lasted six days, there was seen, in the Malpighian bodies, a broad ring of granular substance between the glomerulus and capsule, something like glomerulo-nephritis, but with no thickening of the capsule nor inflammation of the epithelial cells. This is probably a transudate or exudate, not an extravasation. In the fourth pair, the patient dying in the typhoid state after eight days of complete anuria, the epithelium, undergoing coagulation necrosis, had been cast off and filled the tubules, while new epithelium was being generated. From these cases Leyden infers that the process is due to the alterations in the circulation, and not to the action of a toxin. Litten ³¹⁹_{Mar. 24, '94} conducted experiments on the lower animals, ligating the renal arteries and producing coagulation necrosis in the epithelial cells and in the same parts of the kidney as in cholera, thus confirming Leyden's view. On the other hand, Rumpf and Fraenkel ³¹⁹_{Mar. 24, '94} consider that the changes they observed—swelling of the epithelium, a peculiar alteration in the cell-protoplasm, and in some cases destruction of the nuclei—were due to the action of a toxin, and consider the process analogous to that occurring in typhoid fever. The prognosis is more favorable where anuria is replaced by secretion, not because of the establishment of the flow, but because this is an indication of an improved general condition. The regeneration of the epithelium begins in the third week.

Renvers ⁶⁹_{Jan. 18, '94} found the anatomical lesions seen in the fatal cases to consist of evidences of acute enteritis, in addition to the great dryness of the tissues in general and of the blood. The condition of the kidneys varied. The longer the case had lasted, the greater was the degree of swelling and clouding of the epithelium, the staining property of the nuclei, however, being retained. The heart-muscle exhibited granular change with numerous small hæmorrhages. Fürbringer ¹⁴_{Dec. 17, '93} reports three fatal cases exhibiting renal changes which he considers practically identical with those found in the toxic nephritis of diphtheria, typhoid fever, and other infectious diseases; and he sees no reason why cholera should prove any exception to the rule. He agrees with Leyden that the

withdrawal of water from the blood is active in producing this, but believes that the action of the poison is also a powerful factor.

Symptoms.—J. Selenew⁵³⁰_{No.21,'93} found, out of 29 cases of cholera, 4 in which there was a maculo-papular erythema on the extremities. It appeared at the beginning of the algid stage. All 4 cases ended fatally. O. Essen⁵³⁰_{No.9,'94} observed, in 104 cases of cholera, 9 patients with erythema, 2 of whom died. The eruption appeared usually in the typhoid or reaction stage, and simulated mostly a macular or maculo-papular erythema; in 3 cases there were also urticarial wheals, and in 1 case petechiæ and vibices; itching was absent. H. J. M. Watts²_{Oct.7,'93} observed 2 patients who suffered from urticaria and 4 from boils. In each of the cases of urticaria more or less peeling of the skin followed.

Carrieu³¹_{Dec.30,'93} claims that there is a urinary crisis in patients who recover, characterized by the discharge of abundant urine of low specific gravity, rich in urates, but poor in chlorides. As convalescence becomes more marked, the proportion of urea diminishes, that of the chlorides increases, the specific gravity grows greater, and the quantity of urine returns to normal. He considers this crisis of diagnostic and prognostic value. Chachereau¹²⁷_{Dec.12,'93} made analyses of the urine in a case of cholera, finding both albumin and sugar, which disappeared when recovery began.

L. Galliard³⁶⁰_{Oct.,'93} discusses at length the effect of alcoholism upon the symptoms of cholera. He finds that in cases of alcoholics mild cholera, like traumatism, is capable of producing delirium tremens, and may also account for a sudden aggravation of light cases. In many severe cases of cholera terminating in death it is not possible to see that alcoholism affects in any way the course of the disease. We cannot tell whether the patients might have recovered if they had been better prepared to resist the shock to the system. Alcoholic cases are very apt to die, according to the writer's experience; yet he cites a few instances which show that even severe cholera in them is not necessarily fatal. In many other cases of the grave type it is evident that delirium, toxic or asphyxic, is more apt to occur in alcoholics than in others, although it may, it is true, appear in any case. It is, indeed, a common symptom of severe cholera. In still another class of cases of severe cholera it seems probable that alcoholism predisposes to the development of cerebral congestion in the final

stages. Alcoholic cholera cases show, also, a degree of absolute gastric intolerance not seen in others. Icterus is uncommon in cholera,—so much so that it is not clear that alcoholism has any influence upon its production. There may occur a prolonged hypothermia unassociated with other symptoms of the algid stage. It is seen in alcoholics, but is rare. Finally, alcoholism constitutes a powerful predisposing cause to the development of pneumonia.

Carl Koch ³⁶⁶_{Dec., '93} devotes some attention to the subject of the cholera eruption in children, admitted to be of rare occurrence at this age. He has seen it in 3 instances out of 49 cases of cholera occurring between the ages of 2 and 13 years. It developed in the typhoid stage, or the stage of reaction. All the children recovered. He describes it as a bright-red maculo-papular eruption, which appears first in the face and behind the ears, and may spread over the whole body. With this there may be an erythema, which in some places looks like urticaria. The eruption is at first much like that of measles, and on fading leaves spots just as the latter does. There are, however, none of the concomitant symptoms. It is to be borne in mind that measles can occur with cholera, the author having seen one such instance.

Rumpel ⁴_{Aug. 6, '94} observed 151 cases of cholera in Hamburg. Clinically the cases were divided into four groups, which he designated according to their degree: 1. Comma infection without clinical results. 2. Choleriform diarrhœa, where there was only a more or less severe diarrhœa. 3. Cholerine, or choleriform diarrhœa, with vomiting. 4. Cholera, as restricted to cases of severe intoxication with the secondary manifestations,—cramps, cyanosis, sub-normal temperature, hoarseness, and heart-failure. There were 9 cases of the first class, 25 of choleriform diarrhœa, 35 of cholerine, and 82 of cholera. Of the last, 42 died,—51.1 per cent.; or, of all the cases, 30.5 per cent. The onset in most of the cases was sudden, but 22 had prodromal diarrhœa. Schmitz ²¹_{Mar. 10, '94} reports a case of cholera lasting eight days. A relapse began eight days later, and on the fourth day of the relapse contractures suddenly appeared, flexing the joints of the right arm and hand, the right knee, and both feet. A week later the left side of the face was devoid of wrinkles and the tongue protruded to the left. Recovery ensued in seven weeks. Ssmakowski ²¹_{June 9, '94} states that the

algid should be distinguished from the cyanotic stage, in order to treat the disease successfully. In the algid form excellent results were obtained from the use of prolonged hot baths, while hypodermoclysis and enteroclysis were of no great avail.

Diagnosis.—Delépine, of Manchester, ²_{Jan. 20, '04} discusses the value of the bacteriological diagnosis of Asiatic cholera. Diagnostic evidence of four kinds is to be considered: (1) clinical, which is not absolute, as many conditions may resemble cholera; (2) anatomical, of no use, as there is no characteristic lesion, except, possibly, in the kidneys; (3) epidemiological, of no use where the origin cannot be traced, as often happens; (4) bacteriological. The last, according to Koch, ³_{May 31, '03} is absolute; that is, if the stools contain a vibrio which, when cultivated, produces both indol and nitrous acid, giving the cholera-red reaction, and if cultivations on agar are virulent to guinea-pigs, then the case is one of Asiatic cholera, even if the stools are formed and the patients apparently healthy. If the bacilli are not found it does not necessarily follow, according to Koch, that the case is not one of cholera. The author saw in Manchester 4 cases of suspected cholera; 1 recovered and had had the vibrios in the stools. Of the 3 fatal cases, the presence of the vibrios was demonstrated in 2; the third did not have stools nor lesions at all typical of cholera. No other cases arose. Many observers have obtained vibrios from various sources, especially from drinking-water contaminated by sewage. The most important vibrios are those discovered by Finkler and Prior, Deneke, Blachstein and Sanarelli, and Neisser. Some of them give the cholera-red reaction, and are pathogenic to guinea-pigs. He concludes that the bacteriological diagnosis is not always infallible and that the most recent researches tend to confirm, in the main, Pettenkofer's and Cunningham's localistic views with certain modifications.

Zabolotny ⁶⁹_{No. 61, '93} recommends the use of the albumen plate culture for diagnosis. Freymuth and Lickfett recommend the agar plate, while A. Maassen favors the blood-serum plate.

Renvers ⁶⁹_{Jan. 18, '04} dwells upon the difficulty and the great importance of early diagnosis. This can only be made positively by the detection of the bacilli in the stools; and to do this the examination must be made very early in the case, since the vibrios often disappear later. The mere finding of comma bacilli is not suf-

ficient, since many species exist. We must study the method of growth and biological relations of the organism, and combine what is learned in this way with the clinical side of the case. It is useful to remember that none of the various vibrios described as occurring in water have as yet been found in the stools, with the exception of the cholera germ. In many cases the simple examination of a cover-glass preparation of the stools is sufficient to make a very probable diagnosis, when combined with the clinical symptoms. Cultures, especially in peptone-sodium-chloride solution, are absolutely required for certainty in the diagnosis. The bacteriological diagnosis is also important in determining the entire completion of convalescence. Recovery is complete only after the bacilli can no longer be found.

Treatment.—Hchir, in the cholera report of Chudderghat for 1891,²³¹_{Oct.1,'94} mentions the lack of success which attends almost any method of treatment, no single one being specific. In sixty-eight cases treated with salol the mortality was just 50 per cent. Renvers⁶⁹_{Jan.18,'94} speaks of the uselessness of therapeutics in many cases. He favors the treatment by calomel in mild cases, and by enteroclysis and subcutaneous injections to check collapse. Intra-venous injections are not without danger. H. R. Rogers⁶¹_{Sept.30,'93} lays great stress on the horizontal position from the beginning, in bad cases the head even being lowest, in order that blood may be kept in the brain. Moricourt¹⁰⁰_{Nov.14,'93} recommends treatment by copper, based on the claim that workers in this metal show a very slight mortality from the disease. The treatment is an old one, which the writer feels should not fall into oblivion. Ducamp, Jaussaud, and Magnol³¹_{Jan.1,'94} treated three cases by hot baths, given in the algid stage. The elevation of temperature produced by them is in proportion to the gravity of the case and the degree of improvement which takes place. A. Dyes⁵⁷_{Oct.15,'93} recommends chlorine-water, having had frequent opportunities to observe its value in 1867. In the first stage the disease was often aborted by it, and even later the course of the affection was favorably modified. He advises half a teaspoonful, diluted with an equal volume of water, given every half-hour.

H. Rosahnsky⁵⁹_{Feb.3,'94} has found useful, in the beginning of cholera, the Guttæ Botkinæ, of which the formula is: Tr. chinæ comp., anodyn. Hoffmani, āā 15.0; acid. mur. dil., 2.5; ol. menth.

pip., 0.3; chini muriatici, 2.0. M. Sig.: Twenty drops three or four times a day during cholera.

L. Galliard³⁶⁰_{Oct., '93} advises against the administration of alcohol in the treatment of alcoholic cholera patients. He gives an acid lemonade, made from citric or tartaric acid; ice; and, for the gastric irritability, menthol or cocaine. Only in the stage of reaction is champagne permissible, and even then iced coffee is preferable. Opium is dangerous, except in cases of intolerable cramps or in delirium. It should then be given in the form of hypodermatic injections of morphine. There is no drug nor treatment which takes its place in the delirium of alcoholics. Hot baths must be given with caution, if at all, to patients disposed to delirium, as convulsions have sometimes been produced by them. E. Lintilhac⁶⁷_{Feb. 15, '94} praises veratrum album, in frequently-repeated doses, in cholera and cholera nostras. He gives, also, alcoholic stimulants and external treatment for the cramps, coldness, and cyanosis. He believes that this treatment will prove effectual in nearly every case, if not commenced too late. One qualifying statement, however, destroys much of the writer's own commendation,—namely, that all cases of cholera nostras, cholerine, and the like are but the first stages of cholera. Consequently, the typical cases of cholera are the cases advanced beyond the time when the veratrum treatment can do good.

Hager⁴¹_{Jan. 4, '94} reports 967 cases treated with infusions in the General Hospital of Hamburg. He believes this to be the only scientific and practical method and the only one of any value whatever in the algid stage. He employed both subcutaneous and intra-venous infusion of a 0.6-per-cent. solution of chloride of sodium warmed to 40° C. (104° F.), 1 to 3 litres (quarts) at a time. The results were most striking in the algid stage. The chief value of the method depends on its power to tide many patients over this stage, but, if patients passed into the typhoid stage, it appeared to have little influence. Of the 967 cases 291 recovered,—i.e., 30 per cent.,—which is 10 per cent. more than the average number of recoveries as stated by Griesinger. In most of the cases one injection was sufficient. In 92 cases dying in the typhoid stage, the treatment had brought the patients through the algid stage. Recovery occurred oftenest between the ages of 16 and 30 years. The chief interest of the report centres in the com-

parison of intra-venous and subcutaneous injections, far better results being obtained with the latter. The proportions of recoveries were 36.64 per cent. and 28.1 per cent., respectively. No favorable extraneous conditions accounted for the difference. The intra-venous method is more difficult, no more prompt in its effects, and possesses the possible danger of the introduction of micro-organisms, although this has not been proved. Witkowski¹²⁶_{Apr. 15, '94} does not approve of injecting salt solution into the rectum or the veins, or hypodermatically. He advises hypodermatic injections of camphor and, internally, salol and salicylate of bismuth in large doses. For the vomiting, cocaine may be used.

Goriansky²_{July 9, '94} recommends the juice of raw cranberries for the vomiting and thirst. Z. Monsiorski, of Russia,⁵²⁰_{No. 50, '93} praises the administration, by mouth, of 1 gramme ($15\frac{1}{2}$ grains) of musk in divided doses, taken during eight hours. Charrin¹⁴_{June 20, '94} recalls Ducamp's investigations on the volatile oils as decided antiseptics against the cholera vibrio. S. von Witkowski,¹¹³_{No. 41, '93} stating that the symptoms of cholera are due to a general intoxication, and that the abstraction of water is of minor significance and therefore of little value, lays down as indications for treatment: (1) to mitigate the action of the poison (control the vomiting and diarrhœa by anodyne means,—cocaine, creasote, etc.); (2) to stimulate the heart (by camphor injections); (3) to disinfect the intestinal canal (by salol and bismuth salicylate and, later, ichthyol). After the vomiting has ceased the stomach must not be allowed to become empty. Angyan¹⁶⁹_{Apr., '94} treated, in 1892, 271 cases of cholera. They were classed as follows: Choleriform diarrhœa, 12 cases, mortality 0; cholerine, 29 cases, mortality 0; severe cholera, 230 cases, mortality 58.5 per cent. The measures directed against the cause were: (1) enemata of tannic acid; (2) by mouth, creasote or allyl-sulphide; (3) subcutaneous injections of Klebs's anticholerin. Sixty-four cases were treated with tannic-acid enemata, with a mortality of 72 per cent. In one fatal case an injurious action was seen in the formation of thick, parchment-like scabs in the large intestine. He had tried calomel formerly and had seen its use followed by ulcers. He thinks it should be given in only the lighter forms of cholera. Creasote was used in 81 cases, with a mortality of 58.03 per cent. Where it could be retained in the stomach it seemed to be of great value, although 20 per cent. of

the recoveries went into the typhoid stage. If vomiting followed its use the drug had no good influence. Allyl-sulphide was tried in 46 cases, with a mortality of 37 per cent. Angyan quotes Pertik, who discovered that the ethereal, sulphur-containing oil derived from onions was identical with that from garlic, and capable of instantly destroying bouillon cultures of the cholera vibrios. The oil was first administered to patients as a syrup, and, later, allyl-sulphide in an emulsion by mouth, and a 0.1-per-cent. solution by enema. No injurious action was noticed. Anti-cholerin, used in 23 cases, showed a mortality of 52.1 per cent. The number of cases was too small to allow a decisive opinion of its value to be formed, but it was found to bring on the secretion of urine where anuria had existed for three or even four days. In the cases which recovered, convalescence was shorter than that following other modes of treatment. No injurious effects were noticed. Infusion of salt solution was always used in the algid stage, but its marvelously-rapid, beneficial effects often disappeared as rapidly as they came. It has, however, reduced the mortality in some epidemics by 25 per cent.

Hagerstadt and von Lingen,²¹_{Mar.10,'94} from their experience in Russia in 1893, conclude that intra-venous injections and hot baths are the only measures that have even a slight influence in averting the dangers of the algid stage. Although too often useless to save life, they give the patient some relief from his sufferings. For internal medication calomel and tribromphenol-bismuth were used, with the statistics slightly in favor of calomel,—49.6 per cent. to 43.2 per cent. of recoveries.

K. Dehio²¹_{Dec.9,'93} recommends intra-venous injections as superior to subcutaneous ones. This method is less often used, because deemed more difficult. He has endeavored to simplify it by using a sharp, hollow needle about three times the dimensions of that of an hypodermatic syringe, thrusting this directly through the skin into a vein. As soon as it has entered, the blood begins to drop from the large end of the needle. The rubber tube connecting with the vessel holding the warm, sterilized salt solution is then attached. Antiseptic precautions must be followed throughout. He has tried the treatment upon eighteen cases, selected on account of being in the well-developed asphyxiated stage of the attack, with the pulse scarcely or not at all perceptible. In some of the

cases there was temporary improvement, often with a surprising recovery from the symptoms of the algid stage. In only three cases, however, did ultimate recovery take place. He concludes that the injections have the power of removing cardiac weakness and feebleness of the pulse, so far as this depends upon the thickening of the blood and the emptiness of the vessels. In most cases, however, the cholera toxin again produces heart-weakness, and this the injections are not capable of modifying. A. P. Spanoudis⁸⁷_{Sept. 30, '08} describes his treatment of cholera, based upon the theory and practice of Hackin, which was: that stimulation of the pneumogastric nerve would set in action its inhibitory power and would thus control the disturbed function of circulation, respiration, etc., depending upon the sympathetic, and that the method of obtaining this stimulation consisted in blistering the two sides of the neck in the line from the stylo-mastoid process to the sternoclavicular articulation. The writer's results were very favorable and in some cases even remarkable. C. H. Shepard⁶¹_{Nov. 4, '08} claims that the application of heat, in the form of Turkish baths, has been found by others to be a useful procedure in cholera, and that, in his own experience, it has proved valuable in this and all disorders of a diarrhœal nature.

DIARRHŒA.

A. Mills⁸⁶⁸_{V. 3, Nos. 1, 2} in a thorough monograph on the etiology of choleriform affections, raises the question whether or not most of the diarrhœas are due to an excessive growth of bacteria in the intestine, a diminution and cessation of which brings about a disappearance of the symptoms. Of all the authors quoted, Strümpell alone says that "the greater part of the intestinal inflammations of moderate or great severity arise from infectious causes." While himself taking this stand-point, Mills does not deny the existence of aseptic diarrhœas, such as those from nervous influence or from stasis. To investigate the point he examined the stools from 73 cases of diarrhœa, only 3 of which seemed to have no infective casual agent. The bacteria met with were: Koch's spirillum cholerae Asiaticæ, 11 times; spirillum Finklerii, 14 cases; bacillus coli communis, 55 cases; bacillus typhosus, 11 cases; bacillus fluorescens liquefaciens, 20 cases; diplococcus Fraenkelii, 4 cases; staphylococcus pyogenes, 1 case. The bacillus coli communis was found more often than any other bacterium.

It often acted alone, not only irritating the intestine, but also in a general infective way, the cases tending to chronicity and severe relapses. In cases of cholera, as the vibrios lessened in number the colon bacillus increased, this increase being held as the cause of the reactionary fever. Most of the simple diarrhœas are due to combination of the colon bacilli and saprophytic bacteria (*bacillus fluorescens liquefaciens*), the process being of shorter duration than that caused by the colon bacillus alone.

A. Chantemesse ⁹⁰_{Aug., '94} describes the choleraic epidemic occurring at Lisbon in April, 1894. There were several thousand cases, but only one death. The disease was sudden in onset, with giddiness, weakness, headache, abdominal pain, vomiting, and diarrhœa with mucous and rice-water stools. An algid stage, with cramps and cyanosis, was frequent. The disease rarely lasted more than three or four days before recovery was complete. It seemed to be contagious and to be spread by soiled linen. In the fatal case punctiform hæmorrhages were observed in the stomach and intestine. Bacteriologically a motile, curved bacillus was found, with a flagellum at one end, not giving the cholera-red reaction, pathogenic to guinea-pigs at the beginning of the outbreak, but soon becoming innocuous. This seems to favor the view of Gruber that the comma bacillus may vary its characteristics in different conditions.

Plicque ¹⁵²_{Mar. 20, '94} divides diarrhœa in adults into acute and chronic. A subdivision of the acute is the accidental, such as that consequent upon a change of water or the drinking of too much water. It is harmless and is to be distinguished from the acute graver forms, such as those accompanying enteritis, poisoning, typhoid fever, or the like. Chronic diarrhœa may arise from improper nourishment or unsanitary surroundings, or may occur in those who have had serious intestinal conditions, such as typhoid fever. If the diarrhœa resist rational treatment and dieting, especially among the young, a tubercular enteritis may be suspected. For the treatment of the acute form rest, absolute diet, a purgative, followed, if necessary, by opium associated with astringents, is the routine. In the chronic form it is absolutely essential that the clothing, habits of life, and food of the patient be regulated with great care. He must be protected against taking cold. Overshoes and a flannel abdominal binder and dry friction of the

skin night and morning will often be useful. Opium and astringents, if used at all, must be given with great caution. Chalk, the subnitrate or salicylate of bismuth, and phosphate of lime are very serviceable. Diarrhœas of children from 2 to 3 years old and upward do not differ essentially in cause or treatment from those of adults, except that a greater number are the result of errors in diet or taking cold. In nurslings there are primarily two main forms of diarrhœa,—one with pale and watery, the other with green stools. The first is usually caused by improper food, cold, or teething, or purgatives; the second is an acute infection, contagious and epidemic, and often complicated by bronchio-pneumonia. Brunton¹³¹_{Mar., '94} in considering morning diarrhœa, thinks that the stomach retains food and drink taken shortly before sleep, and that when the patient awakens in the morning peristalsis is so rapid that the contents are hurried along to the sigmoid flexure; and if this, as often happens, is in a state of inflammation, chronic congestion, irritability, or even of ulceration, it sends the contents on into the rectum. Gant, of Kansas City,¹⁰²_{May, '94} thinks that many cases of chronic diarrhœa may be due to local disease of the rectum, and that this source should, if possible, be eliminated early.

E. Roos³²⁶_{B. 51, II. 4, '93} publishes observations upon several cases of infusorial diarrhœa. In three cases of severe diarrhœa parasites were found in the stools,—*Megastoma entericum* (Gears) and *Trichomonas intestinalis* (Marchand) in one case, in a second case *Balantidium coli*, and in a third *Cercomonas hominis*. He also found a bodkin-shaped infusorium in the acholic stools of a jaundiced patient suffering from echinococcus of the liver. He describes the microscopical character of the parasites, and reviews the literature. He does not accept the view that the presence of infusoria in the intestines is a matter of no consequence. The bloody stools in the case where balantidium was present were, he thinks, the result of the action of the parasite. The megastoma, if in large numbers on the villi, could interfere with the absorption of food. The movements of parasites on the mucous membrane must also be a source of irritation. Calomel proved very effective against the infusoria, which soon ceased to appear in the stools. He reports a case in which both the *Trichomonas intestinalis* and the *Cercomonas hominis* were present in the stools, yet no diarrhœa occurred.

C. G. Lemièr²²⁰_{Dec.15,'93} reports, in detail, a case which seemed to have all the characteristics of cholera, but in which cultures from the stools produced the bacillus coli. He therefore argues that there is no way of distinguishing clinically between cholera nostras and cholera Asiatica. From a bacteriological point of view, also, he thinks it impossible to make the diagnosis; and, in proof of this, he reviews various published investigations. He believes it demonstrated that cases which are certainly cholera from a clinical stand-point may be caused by different organisms; and that these microbes are normally present, but inoffensive, in the intestines of healthy persons, but virulent as found in sick individuals. They occur, too, in polluted water. The writer discusses some of the views which have been advanced concerning the relation of the bacillus coli to choleriform diarrhœa and the method by which it produces it. He believes that the bacillus has no opportunity to cause new attacks in a healthy intestine. He therefore advises, as a preventive measure, that every attack of slight diarrhœa should be checked as soon as possible, and that simultaneously intestinal antiseptics should be employed.

Treatment.—Porter, of New York,⁴⁶²_{Mar.,'94} lays stress on the importance of regulating the diet in chronic diarrhœa, giving a cathartic and following it with a mixture of opium, dilute nitromuriatic acid, and camphor-water. A writer,⁷⁶⁰_{Mar.17,'94} also urges prompt evacuation in diarrhœa produced by toxic or infectious agents introduced from without or developed in the economy. In the acute forms the neutral salts are recommended; in the chronic, antiseptic purgatives, as calomel. These should be followed by bismuth and opium, with astringents, which are fully equal to the intestinal antiseptics,—salol, lactic acid, etc. If antiseptics are used, those organs on which they act should be watched. Diet is of supreme importance. Aufrecht²⁶_{Apr.2,'94} considers morphia as the best remedy for the diarrhœa of typhoid fever, dysentery, and cholera. K. Hugel, of Würzburg,⁶_{Sept.8,'94} used guava-leaves, in powder or infusion, in diarrhœas from various causes, and found it exceedingly valuable.

A. Pick¹⁶⁹_{Oct.,'93} advises careful diet, with the avoidance of articles found to disagree. A diet of sterilized milk is one of the best in chronic diarrhœa, although not well borne in every case; eggs, peptone, and kefir are then of service. Scraped raw meat is also

useful. In the medicinal treatment he recommends especially bismuth and opium, preceded by purgatives, with appropriate treatment to remove the cause.

C. G. L. Skilmer⁹⁰_{Jan., '94} recommends the antiseptic treatment of diarrhoea on the ground that some, and possibly many, forms of it are due to micro-organisms. He prefers salol to other antiseptics because it passes through the stomach unchanged. Of twenty-three cases of summer diarrhoea treated by him with salol only one proved fatal. He claims that the treatment will give temporary relief in the diarrhoea of tuberculosis. The dose for an adult should be 10 to 15 grains (0.65 to 1.0 gramme) every four to six hours, in gruel or barley-water. The good effects are due to the antiseptic action, although the sedative influence of the carbolic acid will lessen peristalsis. One must guard against carbolic-acid poisoning.

J. Dauriac⁷³_{Sept. 30, '93} made some experiments upon animals and on the cadaver which entirely supported the claims made by others, that rectal injections could be made to pass the ileo-cæcal valve, and that the whole intestinal tract could be irrigated in this way. He then used the method in a number of cases of obstinate and severe diarrhoea in children. In nearly every instance the diarrhoea stopped promptly after lavage with a solution of lactic acid of a strength of 10 in 1000. A solution of creolin was equally efficacious. Creolin injections were also apparently productive of benefit in a case of typhoid fever. In two cases of catarrhal icterus in adults lavage with simple cold water or with Vichy water was rapidly curative. The injections should be made slowly, with about eighty centimetres' pressure, in order not to cause colic. It is not necessary to fill the stomach in this way and thus cause vomiting. He recommends a soft, œsophageal sound attached to a fountain-syringe. Some sort of a valve in the apparatus would be of service to prevent the forcing of fluid from the bowel into the vessel.

J. Ritchie⁶_{Nov. 23, '93} details six cases of acute diarrhoea treated with 2½-grain (0.16 gramme) keratin-coated carbolic-acid pills every three hours. As a rule, six pills proved sufficient. Pain, whether in the abdomen or the legs, was speedily removed, and a rapid lowering of temperature took place in cases which had exhibited fever.

S. Haynes¹⁸⁶_{Nov., '93} reports a case of chronic diarrhœa cured by codliver-oil combined with small doses of opium.

J. Fayrer,⁶¹_{Oct. 21, '93} in a dissertation on tropical diarrhœa, recommends highly an exclusive diet of milk, in small quantities, often repeated,—viz., 4 to 6 ounces (124 to 186 grammes) every hour, day and night. He insists that larger quantities at longer intervals will not do. After years of experiment he has found this more effectual than any other form of treatment. Drugs are, he thinks, of little avail.

Sapelier⁶⁷_{Jan. 30, '94} writes an extensive article upon the treatment of diarrhœa. The first class of cases mentioned by him are those which generally do not demand any treatment,—cases where the diarrhœa is due to the absorption of a toxic substance; where there is dropsy during an attack of gout or rheumatism; where the patient is jaundiced and the diarrhœa is bilious; where the diarrhœa is consecutive to the phenomena of intestinal strangulation; when the stools contain pus; those occurring at the menopause, at the beginning of the exanthemata during typhoid fever, and in phthisical patients. In all of these instances it is necessary to use caution in suppressing the intestinal discharges, or perhaps only to cause a moderation of them, if they must be interfered with at all.

Active treatment is demanded in a second class of cases, as where the discharge is produced reflexly through such an influence on the nervous system as exposure to cold. These are to be treated by hot applications to the abdomen and weak opiates with an aromatic. In cases produced by emotional influences narcotics and antispasmodics are indicated, belladonna being in the first rank of the latter. Chronic diarrhœa produced by hysteria or neurasthenia also belongs to this class, and belladonna is indicated in addition to appropriate general treatment. Electricity and strychnine also give good results, as do turpentine and nitrate of silver. Opium should be used with the greatest caution. The diarrhœas seen in exophthalmic goitre and in tabes are additional examples of the nervous form. In all these cases inert powders in large doses render great service. A modification of the diet is also useful. A second group of diarrhœas requiring treatment contains those due to a toxic or infectious agent introduced into or developing in the economy. Diarrhœa accompanied by indigestion will

usually right itself; but, to hasten the expulsion of the toxins produced, saline purgatives are often useful. In more chronic cases calomel is a better purgative, since it is an antiseptic. After this intestinal antiseptics are indicated, although opium, astringents, and inert powders should not be renounced. Of the many intestinal antiseptics recommended, the author appears to favor especially benzo-naphthol, lactic acid, and the benzoate of bismuth. If the diarrhœa is accompanied by hæmorrhage, astringents should be used, especially perchloride of iron and alum. As an astringent for general use tannin is one of the best. Both in the acute and chronic forms of toxic diarrhœa the diet should be of milk. Aulde, of Philadelphia, ⁷¹_{May, '94} urges the use of copper arsenite in diarrhœa.

MUCOUS COLITIS.

G. Sée ¹⁴_{Dec. 27, '93} gave an interesting lecture upon mucous colitis, which he calls "mucino-membranous enteritis." The disease is most often produced by some obstruction to the course of the fecal matter resulting from hæmorrhoids, hernia, constipation, tumors and other affections of the uterus and appendages, polypi of the rectum in the case of children, hypertrophy of the prostate. There may be no symptoms whatever, or there may be symptoms resembling those of gastric dyspepsia or even dilatation. Morau ²⁴_{Jan. 21, '94} states that in his experience mucous colitis (called by him "pseudomembranous enterocolitis") is associated nearly always with habitual constipation in young women the subjects of some gynæcological affection. There are two forms of the disease,—the one depending solely upon the nervous system, the other in intimate relation to a uterine disease. E. Monod ¹⁵⁴_{Feb. 15, '94} has studied the relation of "pseudomembranous enteritis" to gynæcological affections. He evidently has reference to mucous colitis, since he states that the plaques and ribbons expelled consisted almost entirely of mucus. He reports in detail one typical case, and has seen in all six cases. Pain is a very important symptom. It is situated in the region of the transverse colon and is intermittent. Another symptom is habitual constipation. The author's conclusions lead him to believe that the disease is comparatively common in the course of affections of the uterus and appendages; that it is in reality a chronic colitis; that the patients suffering from it are either subject to chronic constipation or to some neuropathy; that the

disease may occur coincidently with pseudomembranous dysmenorrhœa; that in certain cases the pressure of a retroflexed uterus seems to be the cause, while in others it is more probably the result of an extension of the inflammation from the uterus; and, finally, that one must never forget the possibility of the existence of the disease in women, the subjects of metritis, perimetritis, or uterine displacements, who suffer from abdominal pain, since this pain may be situated in the bowel.

Ullmann⁴¹_{Jan. 4, '94} exhibited a case of mucous colitis from a child in which a bowel-movement of meconium was incased in a membrane which consisted of layers of intestinal mucus. The whole had a distinct sausage shape. Charrin¹⁴_{Aug. 19, '94} considers mucous colitis of more frequent occurrence than is commonly thought. It may last for years, producing a cachexia not unlike that of cancer or tuberculosis. The appetite is lessened, nourishment is poor, the liver is hypertrophied in the majority of cases, and the stools look like washed meat, there being sometimes voided a cast of the intestine; or, as Coyle remarks,⁵⁹_{Aug. 18, '94} the strips may be mistaken for tape-worm. Charrin mentions the presence, in two cases out of eight, of a bacterium coli with strong anaërobic properties.

Treatment.—The administration of milk during the attacks, the combating of constipation with oily purgatives or enemata, and the use of revulsives to the abdomen when the pain is severe are measures recommended by Monod.¹⁵¹_{Feb. 15, '94} Treatment, according to Sée,¹¹_{Dec. 27, '93} consists in emptying the bowels of fecal matter and mucus without using purgatives, relieving pain without narcotics, stopping the accumulation of gas, and combating auto-intoxication if this take place. To accomplish the first he recommends flaxseed or psyllium, hydrastis with senna, or occasionally castor- or olive- oil. For the pain he gives cannabis, bromide of calcium, or bromide of strontium. For the fermentation he uses phosphate of sodium and salicylic acid. As regards diet, the patient can often eat whatever he pleases within reason. Where a restriction is to be made, food rich in cellulose is not to be recommended, and meats containing fat must be used with caution. Charrin¹⁴_{Aug. 15, '94} obtained moderately-good results with intestinal antiseptics, but the best mode of treatment was lactic acid by the mouth, with large irrigations of nitrate of silver. Revilliod²¹¹_{Dec. 24, '93} has had good results from the use of copious injections of bismuth subnitrate.

DYSENTERY.

One of the most valuable contributions to this subject during the year is that of W. Kruse and A. Pasquale,⁵⁸ who point out the gaps in the exact knowledge concerning the etiology of dysentery. As there was no material in Naples, they went to Egypt to conduct their investigations, having first started control investigations in Naples on healthy fæces, and in order to observe the effect of climate they studied their own stools. In the discharges from one they could easily find amœbæ, which increased in numbers in Alexandria, especially when the stools were of more liquid consistency, becoming the less numerous the more solid the stools. In the case of the other, amœbæ were rarely found while in Naples, appearing more frequently in Alexandria and disappearing on the return to Naples. While in Alexandria they also examined the stools from thirty-eight individuals, some healthy and some affected not with dysentery, but typhoid fever, gastro-enteritis, etc. In two only did they find undoubted amœbæ, suspicious forms in several, and in the rest none at all. They are of the opinion that amœbæ could exist as harmless parasites in the intestine in Naples, but that such a condition is exceptional in Egypt. They incline to Grassi's views that the amœbæ find in the ileum favorable conditions for their growth, but that they are killed on passing into the large intestine if this is in a normal condition. The authors observed many amœboid bodies which are to be differentiated from the true amœbæ and not connected with them in different stages of development, as some observers have claimed. Analogous to the finding of the amœbæ in the stools of healthy persons are those cases where the comma bacillus has been found with no symptoms of cholera. This is to be explained by an absence of predisposition on the part of the host. The amœbæ also show different degrees of virulence, those from dysenteric stools being pathogenic to cats, those from normal stools harmless. The characteristics of the amœbæ were carefully studied, but many points could not be fully determined, such as the exact mode of obtaining nourishment and oxygen and the method of propagation. They are often observed to contain red blood-cells and, very rarely, leucocytes. When living they are usually active, moving about and putting out or withdrawing pseudopods. The nucleus is often invisible, but can be brought out by acetic acid, and, as a diagnostic point, it stains

with great difficulty. When an amœba remains stationary for several hours it is an indication that its vitality is lessening and may be entirely gone. During this period it becomes spherical, the entoplasm and ectoplasm cannot be distinguished from each other, and the nucleus becomes visible and takes up stains with far greater ease. Kruse and Pasquale observed from this point three modes of degeneration,—a colloid change, a dropsical degeneration, and a splitting up into sprouting particles. In endeavoring to produce these changes with a practical bearing on therapeutics they found that solutions of tannin (3 per cent.), boric acid (1 per cent.), and infusion of ipecac (0.3 per cent.) had no effect whatever on the activity of the amœbæ. They quote Losch, who found that a solution of quinine 1 to 5000 was rapidly fatal to them. Although they were unable to find the amœbæ in ten out of fifty cases of Egyptian dysentery, they nevertheless conclude that it is the cause of every case, and is found more readily at the beginning, when the stools are mainly slimy, becoming more difficult of differentiation as ulceration progresses. In fatal cases they are usually numerous up to the end. The stools should be examined as soon as possible after evacuation, although the amœbæ retain their vitality for a period of some hours, the exact number not being determined. The cases in which the amœbæ could not be found might be explained partly on the foregoing grounds, partly as a result of therapeutics, and in part as analogous to those cases which in a cholera epidemic contain no comma bacilli in their stools, but are classed as cholera nostras.

The authors also conducted in every case thorough bacteriological investigations to ascertain whether or not bacteria could be an etiological factor. No one form was present constantly, streptococci being most frequently found in about one-half of the cases; in a quarter of the cases bacilli like the bacillus typhosus; then other bacilli, liquefying or not liquefying gelatin; and, finally, staphylococci three times and a streptothrix once. The bacteria are not considered harmless, as one form or other invariably accompanies the amœbæ, and in some cases seems to pave the way for them; and the conclusion is reached that both together produce the pathological changes of dysentery. The formation of ulcers characteristic of dysentery is brought about by a swelling of the submucosa, followed by a necrosis which affects also the over-



Dysentery and Liver Abscess. (Kruse and Pasquale)

Magnified 300 Diameters. Tol's fluid formaloxylin and eosin.

*Penetration of bacteria into the muscular layer and the
lymph-spaces between the bundles of muscular fibres*

Zeitschrift für Hygiene.

lying epithelium, and may lay bare the muscular coat. How the amœbæ get to the submucosa has not yet been observed. Fifteen cases of liver-abscess were studied. (See plate.) Amœbæ were present in 6, but could not be found in 9. Bacteria were present in all but 4. The writers see no reason for classifying liver-abscesses according to the macroscopical or microscopical appearance of the contents or of the abscess-wall. The presence of a fibrous wall shows a limitation of the process and an attempt at healing. Attempts to cultivate the amœbæ were entirely unsuccessful, and nothing was observed like the intermediate forms described by Celli and Fiocca. In producing dysentery experimentally rectal injections were given, cats being the only animals in which positive results were obtained, and the pathological lesions being produced only by the amœbæ from dysenteric stools or from the pus from liver-abscesses. To exclude the bacterial factor injections of pure cultures of the bacteria were made without effect, and the pus from liver-abscesses containing amœbæ, but no bacteria, was pathogenic. The amœbæ of normal human fæces and those cultivated from dysenteric amœbæ by Cunningham's method in straw-infusion were harmless. In conclusion, Kruse and Pasquale consider the amœbæ dysentericæ to be distinct from the non-infectious form, to which they assign the old name of amœba coli. The former, when coupled with bacteria, is held to be the cause of dysentery and of some liver-abscesses, there still remaining other liver-abscesses which must be classed as idiopathic, and in which climatic conditions must be looked on as playing a large part. They indicate many questions which are yet to be solved concerning the amœbæ: whether their virulence is constant or can be lost and acquired; how they gain access to the human body; how the bacteria aid them; where the bacteria come from; how the dysenteric ulcers begin; whether the predisposing causes of cold and indigestion work on the human organism or on the bacteria; whether there is not also a systemic infection as well as a local process; in what way the amœbæ gain access to the liver, whether along the portal system, the lymphatics, the peritoneum, or the bile-passages. There are certain cases which point to each mode, but in multiple abscesses the writers think that the propagation is along the blood-current, either from the ulcers or backward from an original single focus. After a careful *résumé* of the literature

they classify dysentery as amœbic, diphtheritic, and catarrhal; with possibly a fourth form, observed in Japan by Ogata, with a bacillus as the etiological factor.

The work of Celli and Fiocca on the cultivation of the amœba⁵⁰ is reviewed by Goldschmidt.¹³ They succeeded in obtaining cultures of the amœbæ, and found their life-cycle to include two phases,—the stage of the amœba and that of the cyst-form. For nourishment they swallow solid bodies, such as spores, bacteria, and red blood-cells. They multiply by division. The amœboid phase cannot stand high temperatures so well as the cysts. They endure sunlight and dryness well, but antiseptic substances and acids not so well, and they flourish in alkalies. The amœbæ may be obtained from the stools of some persons in perfect health.

Rœther¹³ reviews Kovac's observations and experiments on the so-called amœba of dysentery.⁴⁰⁵ The latter observed two cases of chronic dysentery in whose dejecta amœbæ were found. These were not pathogenic to cats except when the intestinal mucous membrane had been injured, as by a sublimate solution. He therefore looks on the amœbæ not as the cause of dysentery, but as irritants which prevent the healing process in lesions already existing. Withington, of Roxbury, Mass.,⁹⁹ reports a case of amœbic dysentery coming under observation the last two days of the illness, which had lasted about seventeen days. Councilman⁹⁹ had found the amœbæ in great numbers in the stools, and in the discussion of the case distinguished between amœbic, diphtheritic, and catarrhal dysenteries. Epidemics are usually of the diphtheritic variety, in which there is necrosis of the mucous membrane with fibrinous exudation, which may be cast off, leaving irregular ulcers. There are two forms of the catarrhal dysentery,—one in which the follicles are affected, giving rise to small ulcers; the other, in which there is purulent catarrh of the mucous membrane with more or less erosion of the surface, with superficial ulcers. Amœbic dysentery gives a distinct type, the submucosa being primarily affected, and a great swelling of the intestine is the most marked feature; in addition, there are nodular swellings in which ulceration begins, breaking through to the mucous surface; the edges of the ulcers are deep and undermined, and may communicate with each other through the submucosa; sloughs of the mucous membrane may also form.

A. Calmette<sup>195
Sept., '03</sup> publishes the results of extensive observations on the dysentery of the extreme East. Statistics show that the disease has certainly diminished in frequency and severity in Cochin-China, probably as a result of the better hygiene which followed the French occupancy. Chronic diarrhœa he considers but a form of dysentery, dependent on the same process. Studies of the normal stools should precede those of pathological evacuations. In the case of Europeans he finds a large number of species of micro-organisms, which he enumerates, including, among others, the colon bacillus and an amœba. In the case of the natives the number of species is less numerous, probably as a result of the more simple and almost entirely vegetable diet. His researches on pathological stools do not tend to confirm the observations of Kartulis relative to the amœba coli. He has also not been able to find the bacillus described by Chantemesse and Vidal. In the dysenteric stools there were, however, besides the bacteria found in normal passages, two species which he regards as important,—a coccus having all the properties of the streptococcus erysipelatis, and the bacillus pyocyaneus. He isolated these, and made inoculation experiments with pure cultures; and, as a result, concludes that the pyocyanic bacillus plays a prominent part, but that it is constantly aided by the streptococcus of erysipelas. The pathology of dysentery is explained by the action on the mucous membrane of some such cause as indigestion, chilling, or the like, which permits of infection by the streptococcus. This produces a desquamation of the epithelium or, in worse cases, the formation of a multitude of minute abscesses. This constitutes only a diarrhœa; but, should infection by the pyocyanic bacillus follow in the mucous membrane and the neighboring tissues, toxins are generated, the general condition becomes much worse, and we have to do with dysentery.

Calmette has tested the truth of this explanation by experiments upon animals. He has not been able to obtain a transportation of the microbes from the intestine to the liver. In only one of eight cases of hepatic abscess could he find a micro-organism in cultures. The production of hepatic abscess is dependent upon the action upon the liver-tissue of the necrosing toxins produced in the ulcers in the intestines by the bacillus pyocyaneus. The pus of the abscess is primarily without micro-

organisms, but can be invaded finally by different species. This invasion renders the prognosis more unfavorable.

Quincke and Roos⁴_{No. 45, '93} observed two cases of dysentery in which the pathogenic character of the amœbæ seemed to be undoubted. Besides the ordinary variety there were encysted forms, which were most frequent after the patients had had a course of calomel. The first case was a severe epidemic one, contracted in Palermo, fourteen other persons being attacked at the same time. The cause appeared to have been an artificial mineral water. The injection of the stools of this case into the rectum of cats produced severe dysentery, with death in two or three weeks. The mucous membrane of the large intestine of the animals exhibited post-mortem well-developed ulcerative inflammation of the large intestine. When given by the mouth, infection was not produced unless the stools contained encysted amœbæ. The second case was much milder, and developed in Kiel. It was rather an instance of chronic enteritis, the amœbæ exhibiting slight differences in appearance; but it was of especial importance that they were not pathogenic for cats, producing only a slight diarrhœa. The authors then examined the stools of 24 healthy persons, to whom Carlsbad salts had been given. In 9 of these they found amœbæ, usually in small numbers. They are disposed to adopt the view that there are three forms of the organism: (1) the *Amœba coli felis* (Lösch), which is the true amœba of dysentery; (2) the *Amœba coli mitis*, the cause of the diarrhœa in the second case; and (3) the *Amœba coli vulgaris*, the form observed in healthy individuals. They found that the employment of calomel in small doses appeared to be the best method of reducing the number of amœbæ in the stools, although they did not permanently disappear.

Prieur²⁴⁵_{Mar., '94} contributes an elaborate article upon an epidemic of dysentery which attacked the garrison at Poitiers in 1892. There were in all 325 cases in the hospital. The disease appeared to have originated in the very unhygienic conditions prevailing in one of the barracks, and to have been spread thence by direct infection. The soil at the starting-point was most at fault, having been impregnated by faecal matter; the water, however, was also certainly impure. No influence could be ascribed to imperfect food-supply, climatic influences, or exposure to fatigue. There

were a number of instances which prove the contagiousness of the affection, either direct or indirect; the latter through the faecal matter drying and being spread about in the form of dust. To facilitate the study of symptoms the writer divides the cases into the very mild, the benign, and the grave forms. As complications intermittent and typhoid fever were seen, and as sequelæ parotitis, peritonitis, occlusion, and arthropathy. None of the cases became chronic. The first form was represented by cases appearing at the end of the epidemic, which were scarcely more than slight diarrhœa lasting four or five days. The benign form was much the most frequent. In this there were loss of appetite and diarrhœa, followed in a couple of days by very numerous passages containing blood or mucus. Temperature was normal and there was little tenesmus. The grave form was characterized by the very great number of stools, the intensity of tenesmus, the early and extreme enfeeblement, and the presence of fever. In the fatal cases, which usually belonged to this third class, post-mortem examination showed the large intestine to be inflamed and ulcerated throughout, the liver and kidneys congested, and the mesenteric glands swollen and red. No culture experiments are reported. In 10 cases there appeared the complication of dysentery by malarial fever of the remittent type. The number of stools and the quantity of blood in them was increased when the fever was greatest. In 1 case, the details of which are given, there was an association of typhoid fever and dysentery. The two diseases appeared to start at the same time, but the symptoms of the latter gave way later to those of the former. The post-mortem exhibited the lesions of the two diseases. The writer found 5 instances of parotitis occurring during the course of dysentery, 1 of which terminated in suppuration, and 5 cases of arthropathy, the symptoms and course resembling those of gonorrhœal arthritis. The arthropathy usually attacked one articulation first and then slowly spread to others, with marked atrophy of the muscles. In 1 instance peritonitis and intestinal occlusion, the result of strangulation by a band, developed in the course of dysentery. The mortality of the epidemic was 4.92 per cent. The fact that such different causes are assigned for dysentery has led Laveran ¹⁴_{Nov. 8, '93} to make an etiologic study of 10 cases recently under his care. In only 1 case was he able to find the amœba, and then in but small number; in the

remainder the stools did not contain any microbes which could be assumed to be the cause. He concludes from this that sporadic dysentery in temperate climates is certainly not due to the amœba nor to the specific action of any other micro-organism. It is possible, as has been suggested, that microbes ordinarily present in the intestine, such as the colon bacillus, may take on a virulent property, but this is pure hypothesis. II. A. West^{Oct. 7, '93} views dysentery not as a morbid entity, but as including a group of inflammations of the large intestine, and suggests the division into acute catarrhal, acute diphtheritic, amœbic, and secondary forms. Amœbic dysentery is, he thinks, more common than is generally supposed, as shown by the details of seven illustrative cases chosen from those seen by him during the winter and spring of 1892-93. The amœbæ probably enter through impure drinking-water, causing symptoms uniform in character, viz., an alternation between improvement and relapse. This form of the disease is essentially chronic and difficult to cure, owing to the nature or location of the lesions, which consist of ulceration of the large intestine and sometimes of the ileum, with infiltration and undermining of the mucous membrane.

Spruyt^{Apr., '94} reports in full an epidemic of dysentery occurring in the garrisons of Auvers and Brasschaet during the summer of 1893. There were 324 cases, 18 ending fatally. Dividing the epidemic into periods of ascent, fastigium, and decline, the mortality in the ascending stage was nearly 30 per cent.; in the fastigium, 4.5 per cent.; in the decline, 3.5 per cent. The incubation of the cases varied in length from three to fifteen days, a prodromal period of diarrhœa with serous, odorless stools, lasting one to eight days, the onset of the disease being counted from the appearance of mucous, bloody stools, which were offensive and sometimes gangrenous in odor, and numbered from fifteen to fifty in twenty-four hours. The general symptoms were: anxious, pinched features, expressive of pain; retracted abdomen, the patients lying immovable because of intense pain on movement; rapid emaciation; diminished secretion; sometimes anuria. In the cases that recovered these symptoms gradually diminished, and the appetite for solid food returned long before the stools lost their dysenteric character, the food being apparently well borne. Three distinct clinical forms could be distinguished,—a mild, a grave

hæmorrhagic, and an algid. In many of the other soldiers not confined to bed there was a mild diarrhœa with pea-green stools, rebellious to all treatment. As complications there were an arthritis, possibly rheumatic, but probably analogous to that complicating gonorrhœa, occurring in eleven cases; an intestinal perforation; thrush, rather frequent; conjunctivitis, five cases. Abscess of the liver was not observed. Recrudescence occurred in 6 per cent. of the cases; there were no true relapses. Intermittent fever occurred in 1 case. In the etiology, the climate was held to be favorable, the summer being hot and dry. The drinking-water was the probable source of infection. Cases of transmission by contagion seemed clear. Chaltin⁴⁵⁴_{Apr., '94} studied the cases anatomically and bacteriologically. In this epidemic the amœbæ could not be found, but the plate cultures showed constantly the presence of the bacillus coli communis and the bacillus proteus vulgaris. In four cases the bacillus fluorescens liquefaciens was met with, and the staphylococcus aureus once. Chaltin is of the opinion that the combination of the colon bacillus and the proteus bacillus was the essential cause, and that the epidemic is decidedly different from those seen in tropical climates. F. E. Murphy⁷²_{Feb., '94} reports in detail a case of amœbic dysentery in a man, a native of Russia, but a continuous resident of Kansas City for four years. The symptoms were those of chronic diarrhœa with frequent exacerbations, the condition constantly growing worse. The patient was greatly emaciated. The stools were brownish and contained some mucus and sometimes blood-stained, gelatinous masses. There were at times thirty to forty evacuations in twenty-four hours, containing active amœbæ.

Bertrand and Baucher³⁶³_{No. 40, '93} made some bacteriological studies on the stools of dysentery in a small military epidemic. No amœbæ were found, but eight species of micro-organisms were isolated, with which cultures and inoculation experiments were made. They discovered no specific microbe, and believe that it is the union of the different kinds which produces the pathogenic action, and that some alteration of the mucous membrane is necessary as a predisposing cause. Arnaud¹⁴_{Mar. 21, '92} in sixty cases of acute dysentery found the colon bacillus constantly present. Experimenting with it on dogs, he was able to produce dysentery, clinically and pathologically. Maurel¹⁰⁸⁸_{May 6, '94} agrees with Arnaud

that microbes constantly present in the intestine may become pathogenic when the state of the mucous membrane is altered by sudden changes in temperature.

Jessop, of Redhill, ²_{July 2, '94} insists on the rare occurrence of acute dysentery and liver-abscess at the same time. He saw many cases of dysentery and made a number of post-mortem examinations, and in but one of the latter was there abscess-formation in the liver. He does not, however, deny the relationship between the two. Rennie, of Meerut, India, ²_{Aug. 25, '94} contends that liver-abscess does not necessarily presuppose an attack of dysentery. In seven cases he was unable to get any history of dysentery; two had never had a day's illness before. In the three fatal cases there was no sign of recent or remote dysentery. Forbes, in Africa, ²³⁹_{June 1, '94} reports a fatal case of amoebic dysentery. Olivier ²⁴³_{Nov., '93} gives the history of an epidemic of dysentery and of diarrhoea among the soldiers quartered at St. Stephen's in 1892. The main factor, next to contagion from the water-closets, seemed to be meteorological, —a warm, damp summer, with sudden changes of temperature. Similar observations are made by Bernard ²⁴³_{Aug., '94} in an account of dysentery in the garrison of Dijon in 1892-93. Here the situation was unfavorable, but the outbreak seemed to be brought about by warm, damp weather, with sudden variations of temperature. Occasional cases during the winter seemed to show that the etiological factor was not thoroughly removed, and that only favorable circumstances were needed for an epidemic.

Hall, of Fayetteville, O., ¹⁹²_{Feb., '94} reports briefly sixteen cases of epidemic dysentery attacking children under 16 years of age. All recovered, although there was in each case a great loss of blood. Reed, of Shanghai, ²³⁵_{Mar., '94} reports a case of sprue lasting three years. There were three or four stools daily, gray in color, and of the consistency of the white of an egg. Ipecac finally relieved the condition.

Treatment.—It is important in amoebic dysentery, according to West, ¹_{Oct. 7, '93} to combat the anæmia and wasting by a liberal nitrogenous diet. He considers antiseptic irrigation important, but did not find injections of solutions of quinine curative, although destructive to the amœbæ. He favors the injection of nitrate of silver, 30 grains (2 grammes) to the quart, with occasional doses by the mouth of salines, bismuth, and salol. Maurel ¹⁰⁸⁸_{May 6, '94} extols

the value of a milk diet, and thinks that the lactic acid is not only an intestinal but a general antiseptic. Prieur²⁴⁵_{Mar., '94} states that in the Poitiers epidemic, in 1892, treatment in the very mild cases consisted in the use of saline purgatives or in the administration of salicylate of bismuth with an opiate. In the benign form opium, bismuth, and ipecacuanha were employed, the latter drug being very useful in the grave form. All cases recovered in which treatment could be begun at once. Eggs and milk were given during the height of the attack. In the way of prophylaxis, disinfection was looked after; the men not attacked were made to wear an abdominal bandage of flannel and to take less night-exercise; every man with diarrhœa was placed in the infirmary; the condition of the food was attended to, and a small quantity of rum given as a tonic measure, and isolation of cases of the disease was practiced.

In a case seen by Murphy⁷²_{Feb., '94} high rectal injection of a solution of quinine made the number of the stools and of the amœbæ diminish, but the best results followed the rectal injection of water acidulated with nitric acid, and the internal administration of salol, quinine, and Dover's powder. At the time of the report the patient seemed cured.

Khory, of Bombay, ¹⁰⁵⁵_{Aug. 1, '94} describes the therapeutic actions and uses of indigenous drugs and their compounds in dysentery. He classes the drugs according to their properties, as aperients, astringents, analgesics, tonics, etc., and shows how the "*vaid*s," or unqualified practitioners, have arrived, through empiricism, at a mode of treatment which can be rationally explained.

Four Russian physicians—Mokeieff, Eiger, Sanotzky, and Volkoff—are quoted ¹⁰⁹_{Dec., '93} as reporting independently in favor of naphthalin in dysentery. Mokeieff administers it by high enemata, the others preferring to give it by mouth. Mikhailoff and Ossovsky ¹⁰⁹_{Dec., '93} have successfully used creolin enemata. Summers, of Waukesha, Wis., ¹⁹⁹_{May, '94} uses an enema of $\frac{1}{2}$ ounce (15 cubic centimetres) of pepsin to 6 ounces (180 grammes) of water, and follows it by one of starch-water and laudanum, giving the patient much relief, and, with general treatment, bringing on speedy convalescence. Yarrow is spoken of highly by Clive, of Woodstock, Va., ¹⁸⁶_{Sept., '93} and Robertson, of Jackson, Cal., ¹⁸⁶_{Mar., '94} Rudnew ⁵³⁰_{No. 20, '93} found enemata of corrosive sublimate (1 to 6000) or of lysol (1 per cent.) of great use. Wrafter, of Dehra Dun, ¹⁰⁵⁵_{July 1, '94} describes botanically

the Indian *bael*, or Bengal quince, and praises its use in dysentery, giving directions for making pharmaceutical preparations. Gelpke, of Java ¹¹⁶_{July, '94}; Uhle, of Annaburg, ¹¹⁶_{July, '94} and Hagge, of Hamburg, ¹¹⁶_{Sept., '94} recommend, in the highest terms, the bark of simaruba for dysentery, Hagge asserting that it is a specific.

H. A. Haenes ²_{Nov. 11, '93} reports a case of dysentery consecutive to typhoid fever in which the patient had an average of over thirty-five stools a day for more than five weeks. A long list of remedies was given, but nothing was of any avail except iron. R. P. Jones ¹⁶_{Aug., '94} treated one case successfully by means of ipecac. Jessop ²_{July 2, '94} has also had good results from this drug. R. T. Knox ¹⁴³_{Nov., '93} details his experience with dysentery in his own person. All plans of treatment tried by himself and others failed until he was induced to try an infusion of a Mexican shrub known as *Bisbiranda armagosa*. Improvement began very promptly and ended in perfect recovery. D. J. Parsons ¹⁹⁹_{Nov., '93} considers cathartics and opium of the greatest importance in the first stage. The aim should be to procure "slow and constant purging," *i.e.*, the dysentery should first be converted into a diarrhœa.

CONSTIPATION.

F. Huber, of New York, ¹_{Aug. 4, '94} reported a case of congenital constipation, due to the watery element being absorbed in a too long sigmoid flexure. Jacobi pointed out that the descending colon is proportionately longer in the fœtus and infant than in the adult. Fink, of Calcutta, ¹⁰⁵⁵_{Feb. 1, '94} reports a case of severe constipation, in a child of 10 months, simulating for a time incipient hip disease, with pain reflected to the knee, obliteration of the gluteal fold, and fixation of the left hip-joint. The symptoms disappeared after the bowels were moved. A. Jacobi, ⁵¹_{Dec., '93} of New York, exhibited a boy of deficient intellect who was habitually constipated, probably as a result of his mental condition. W. Stewart, of Bryn Mawr, Pa., ¹³⁸_{Apr., '94} emphasizes the important part which neglect to obtain a daily evacuation of the bowels plays in producing constipation. Another factor, also, is the habit of passing wind frequently *per ano*, the distension of the bowel by gas being necessary to the onward progress of the fœces. Staple ⁸¹⁴_{Aug. 15, '94} states that hysteria in the female and hypochondria in the male, or even conditions bordering on insanity, may be the result of con-

stipation. His classification is practically that of Marinel and of F. Schenk,⁸⁰¹_{Oct., '93} who read a brief but comprehensive paper on constipation before the Eastern Kansas Medical Society.

Friedenwald, of Baltimore,⁹_{Aug. 11, '94} separates atony of the intestine from chronic constipation, which is often only a symptom of the former condition. The atony usually affects the colon, which is unable to expel the fæces. It may be primary, as the result of improper diet, sedentary habits, or a too frequent use of cathartics; or it may be secondary to many disorders, as obesity, disease of the heart, lungs, or liver, typhoid fever and other intestinal diseases, or organic nervous diseases. It is often found in childhood and may be congenital. The symptoms are marked constipation, headache, vertigo, nausea, and pains in the back and loins. Nervous symptoms are often present. The signs are marked tympany and sometimes the ability to detect the distended colon and fæcal masses by palpation. By giving an enema of 200 to 300 cubic centimetres ($6\frac{1}{2}$ to $9\frac{1}{2}$ fluidounces) of water, splashing can be heard, while normally a much larger amount—500 cubic centimetres (1 pint)—will be required to produce the sound. Enteroptosis may often be a complication, as well as atony of the stomach and membranous enteritis. Finally, *ileus paralyticus* may result. Chronic constipation may also be the result of enterospasm, chronic colitis, or dilatation of the colon. Atony of the intestine can be diagnosed from the two first by the splashing with the small amount of water, by the peculiar stools in enterospasm, and by the mucus in chronic colitis; rectal examination will exclude dilatation of the colon.

Treatment.—F. le Marinel, of Brussels,⁸⁶⁸_{v. 3, Nov. 1, 2, '94} publishes an excellent monograph on “The Mechanical Treatment of Chronic Constipation.” The author’s results are admirable, 90 per cent. being cured in a series of 158 cases. The constipations calling for mechanical treatment are those (1) from anæsthesia of the mucous membrane; (2) from muscular paralysis; (3) from induration of the stools; (4) from mechanical obstacles. The contra-indications are (1) acute inflammation in any of the abdominal tissues; (2) ulceration of the stomach or intestine; (3) tumors of the alimentary canal (carcinomata, sarcomata, polyps); (4) large fæcal masses of stony hardness. The duration of the treatment varies according to the case, the average being about four or five weeks. The

massage should be stopped gradually, not suddenly, sittings being given at increasing intervals up to eight days, in order to avoid relapses. The cases are recorded carefully, 11 in detail and 147 in an extensive and comprehensive table. The conclusions are: (1) mechanical treatment can be classed among those therapeutic agents whose action on the circulation, respiration, and general nutrition is decidedly energetic; (2) it modifies the abdominal circulation and dispels certain passive congestions, especially those of abdominal plethora; (3) it increases the muscles in volume and strength; (4) it is the best curative agent for constipation from muscular paresis or paralysis not due to central nervous disease; (5) it is the best curative agent for constipation dependent on hypoesthesia or anesthesia due to local causes; (6) finally, it is formally contra-indicated when the constipation is due to acute inflammation or to tumors.

Germain Séc⁵⁹_{Feb. 3, '94} considers that most of the dyspeptic conditions, dilatation of the stomach, etc., are really cases of constipation, and that this may mechanically tend to produce hæmorrhoids, hernias, vesico-uterine tumors, hypertrophy of the prostate, etc. Laxatives, and not purgatives, should be used. For the pain, the bromide and chloride of calcium together, or menthol in solution, are effectual. Phosphate of soda will prevent fermentation and tympany.

A. Forel, of Zurich,⁴¹_{May 28, '94} contributes a study on "The Cure of Constipation by Suggestion," claiming that it is often a nervous affection and that many of the remedies commonly used act by suggestion. Uffelmann, of Mammern,²¹¹_{May 15, '94} cannot agree with this, and cites a case where hypnotism was not successful in relieving constipation, but where a cure was produced by the use of cold baths. He urges that hypnotism in many cases would be impracticable and that patients would not submit to it. He lays stress on massage, gymnastics, faradization, cool baths, etc. Forel replies that Uffelmann has misunderstood him by confining his remarks to verbal suggestion, and claims that Uffelmann's case was relieved by suggestion, the treatment having a strong mental influence.

Collignon, of Maubert-Fontaine,⁵⁷⁷_{Jan., '94} advocates lavage of the intestine with large amounts of oil,—enough, if necessary (which is rarely), to pass the ileo-cæcal valve. Chercheffsky⁹⁹⁶_{Mar. 25, '94} has also brought this method forward in Russia.

According to Stewart,¹³⁸_{Apr., '94} drugs should be used only to relieve the symptoms; the cure must be wrought by regulation of habits, dress, diet, and exercise. Massage and electricity are of great value in aiding to establish the habit of regularity. A. E. Gresham¹⁸⁶_{Oct., '93} urges the free use of water for constipation, especially in summer. G. M. Wagner⁷⁸⁶_{Oct., '93} also insists on water, but urges that it be taken a half-hour before meals. He speaks, too, of the necessity of a proper diet, regular exercise, and the avoidance of cathartics. A. F. Plicque¹⁴_{Jan. 7, '94} refers to the great frequency of the disease in children. The diagnosis is easy, although one may be misled by the cases in which faecal material accumulates in the canal and remains there too long, in spite of the occurrence of a stool every day. The recognition of the cause of constipation with a view to therapeutics is a most important matter. Treatment is, first, that of the cause; second, hygienic; and, third, the use of purgatives. In the second class he includes the regulation of diet, massage, electricity, hydrotherapy, and the use of injections. Purgatives should be used only in an emergency, and are indicated only in obstinate constipation, where there has been no passage for several days. If a diagnosis of atony of the intestine can be made, Friedenwald⁹_{Aug. 11, '94} advocates exercise, massage, electricity, diet, mineral waters, and large enemas (10 to 15 ounces—310 to 465 cubic centimetres), preferably of pure olive-oil.

INTESTINAL OBSTRUCTION.

L. Hektoen⁴⁵¹_{Dec., '93} reports a case of four healed ascending ileal invaginations, symmetrical and equidistant. The patient, from whom no satisfactory previous history could be obtained, had been operated upon for hernia, and died of peritonitis thirty-three hours later. The invaginations were found at the autopsy,—the first fifty-four centimetres below the pyloric orifice of the stomach, the distance between each being thirty-three centimetres. All the invaginations were ascending. The inner walls of the intestine had undergone fusion to so great an extent that the specimens were at first very puzzling. The author dwells upon the rarity of ascending invaginations and the similarity of those seen in this case to that of the agonal type. He suggests that the man may have been, at some time, near the point of death, and that the condition may have developed at that time, and upon recovery

the agonal invaginations may have persisted. Another case of intussusception is reported by J. B. Bullitt, ²²⁴_{Dec 30, '93} in a girl-baby of 18 months, a few hours after it had romped with its father and been tossed by him into the air. The intussuscepted mass could be felt in the rectum, about three inches above the anus. Several futile attempts were made to reduce it by holding the child inverted and injecting warm water. On the third day portions of intestine were passed, and death occurred on the fourth day.

T. M. Burns ¹⁰⁹⁹_{Jan., '94} reports a case of intestinal obstruction in a woman who had suffered from frequent small stools with straining for two or three days. She then developed intense pain, a tender spot above and to the left of the umbilicus, a small swelling in this locality, and gurgling and faintness produced by pressure. Injection of water distended the colon up to the point of obstruction. This having failed to relieve the patient, she was put in Trendelenburg's position, a second enema given, and the seat of obstruction gently manipulated, as a result of which the tumor suddenly disappeared. A stool soon followed, and recovery ensued. The writer thinks the case clearly one of volvulus or intussusception. He discusses the differential diagnosis of the two, but is unable to decide with which he had to do in this case.

Hache ⁵⁷⁷_{Jan., '94} describes the case of a child of $4\frac{1}{2}$ years, who, after a slight diarrhœa, had a hæmorrhage from the bowel, followed by death. The diagnosis of intussusception was confirmed by the discovery post-mortem of the invagination of all the small intestine and a portion of the large intestine at the sigmoid flexure. A. A. Moore ⁴³_{Dec., '93} reports the case of a man of 40 years, who was suddenly attacked by violent pains in the right side, with weak pulse and pallor, and, on the next day, tympany and tenderness of the whole abdomen, and possibly a tumor in the right iliac region. Opiates were first given, and then cathartics. On the third day there were several bilious passages. The tympanites and tenderness continued, the abdominal wall was hard, and fever developed. This condition persisted, with fluctuations, for twenty-four days, when a gangrenous portion of intestine was voided. The case lasted, in all, eight weeks, and terminated in recovery. The examination of the specimen seemed to indicate that it consisted of a slough of only the mucous and submucous portions of the intestine. E. O'Connor, of Lincolnshire, England, ²_{July 21, '94}

reports a case of intussusception followed by recovery, sloughing having occurred. A portion of the ileum with a Meckel's diverticulum was passed by the rectum. A. Sutcliffe, of Burnley, Eng., ²July 21, '94 describes a case followed by sloughing and recovery. Aitken Clark ³⁶July, '94 exhibited to the Obstetrical Society of Edinburgh a specimen of intussusception at the ileo-colic valve, occurring in an infant of 9 months.

Zuber ⁷No. 6, '94 showed an invagination removed by laparotomy. In making reduction ruptures occurred necessitating resection. No cause for the condition could be found. J. V. Wichmann ⁹⁹⁶Sept. 10, '94 investigated the subject of intestinal invagination, statistics being arranged from 976 cases. In general, the male sex, robust constitution, and childhood predispose to invagination. Traumatism does not seem to play any part. Infants under one year usually succumb in a few days. Adults may be able to hold out for a long time and even recover, convalescence being slow. If the jejunum is the seat of the invagination, the tumor is very seldom in the right iliac fossa. Morphia, lavage of the stomach, and rectal exploration are to be used in the treatment.

K. Minnich ³¹⁹Sept. 1, '94 reports a case of a three-day-old child who died with symptoms of intestinal occlusion. At the post-mortem examination multiple strictures were found in the small intestine, apparently caused by volvulus. From the location of the meconium the volvulus must have occurred at about the fourth month of pregnancy. There was no history of traumatism to the mother. Strahan, of Northampton, ⁶Nov. 18, '93 reports a case of enormously-dilated sigmoid flexure in a chronic lunatic, volvulus having produced obstruction.

Brindeau and Budin ²¹Sept. 2, '94 observed congenital narrowing of the small intestine in an infant. Laparotomy was performed two days after birth, and a stricture found in the ileo-cæcal region which could not be penetrated. A false anus was made and the infant survived for nine hours. Appert ⁷No. 7, '94 showed a small intestine, narrowed at a point ten centimetres above the cæcum, with no sign of cicatricial tissue or of tuberculosis to explain it. Symptoms of occlusion had happened once or twice before, several years before death. Congenital narrowing was regarded as possible. D. Fraser ²¹³Aug., '94 exhibited to the Glasgow Society a specimen of malignant stricture of the transverse colon. Comments were made

on the unusual seat and on the removal of most of the cancerous growth by ulceration.

A. Ott, ³¹⁹_{Sept. 1, '94} in a contribution to the pathology of enteroliths, reports two cases, occurring in women of 50 and 56 years of age. In one case the mass filled the rectum, and had to be broken up with a spoon-handle before it could be removed. In the other, habitual constipation gave way to profuse diarrhœa and tenesmus, lasting six weeks, occasioned by the downward progress of the mass.

Middleton, of Glasgow ²¹³_{May, '94} reports three cases of fœcal impaction,—two in children, with recovery, and one in a woman. In the last, the mass remained in spite of enemata and was thought to be cancerous. At the post-mortem examination the entire large intestine was found packed with fœces, and, as no lesion existed, death was supposed to be due to absorption of ptomaines. In a discussion before the Clinical Society of London, Lauder Brunton and Watson Cheyne ²_{May 5, '94} mentioned a case illustrating the important action of the toxins developed in intestinal obstruction. Galeazzi ⁴⁹⁷_{May, '93} examined the urine, chemically and bacteriologically, from six cases of obstruction. The bacterium coli commune was found in three, all of which ended fatally. The other three recovered. Galeazzi was able to obtain the bacilli in the urine of animals whose intestines had been ligated.

Chapin, of New York, ⁵¹_{Aug., '94} reported a case dying with symptoms of intestinal obstruction, no cause for which could be found post-mortem. Happel, of Trenton, Tenn., ⁷⁴_{July, '94} also reports a case of fatal obstruction the cause for which could not be discovered. J. R. Johns ⁸¹⁴_{Dec., '93} reports an interesting case, apparently of acute intestinal obstruction, in a boy of 6½ years of age. The symptoms were peculiar in that there were throughout the attack repeated convulsions, often more or less unconsciousness, and evidences of some central disturbance. On the first day there was diarrhœa; on the second, constipation and pain in the abdomen, yet without tenderness or distension. On the third day stercoraceous vomiting and death occurred. An autopsy showed only a small amount of fœcal matter, nearly all of which was in the stomach. There were also nine large lumbricoids in different parts of the small intestine. At two points in the jejunum the vessels were engorged with clotted blood. No evidence of intestinal obstruction could

be found. The writer believes that an intussusception or a volvulus had existed, but had disappeared before death or during the autopsy. In a second case there were what were regarded as the symptoms of typhlitis, and later of appendicitis, with suppuration and perforation into the colon, followed by recovery. The stools, however, were not examined for pus or blood.

F. Nixon¹⁶_{Feb., '94} exhibited to the Royal Academy of Medicine of Ireland a specimen of apoplexy of the mesentery in a woman 60 years old. G. Miller, of Middlesborough, ⁶_{Jan. 20, '94} reports a case of embolism of the mesenteric vessels with symptoms of obstruction. Laparotomy revealed the true condition. Munro, in whose service the case occurred, gives the following points for diagnosis: (1) a source of origin for the embolus; (2) profuse hæmorrhage from the bowel; (3) severe, colicky pains in the abdomen; (4) marked tympany at times; (5) rapid reduction of temperature; (6) demonstration of embolism in other arteries; (7) demonstration, by palpation, of infarcts between the emboli. In the case described an infarct was so marked as to simulate a tumor, thus leading to operation. A. E. Austin, of Boston, ⁷⁶⁰_{Oct. 14, '93} reports a case of intestinal obstruction of unknown cause, but in which there was probably an embolism. Councilman⁹⁹_{Apr. 20, '94} relates three cases of occlusion of the superior mesenteric artery, occurring in patients past 60 years of age. Atheroma of the aorta existed and probably caused the clot-formation. The clinical picture of the first was that of intestinal obstruction; in the second, of marked peritonitis; in the third, of a slight beginning peritonitis.

Padgett, of Columbia, Tenn., ⁸⁶_{May, '94} reports a case of obstruction, comatose when seen. At the autopsy a fibrous cord was found compressing the intestine and reaching from the caput coli to the mesentery. Councilman⁹⁹_{May 10, '94} exhibited specimens from a case of obstruction dying sixteen hours after the onset. The cause of obstruction was a Meckel diverticulum which was tied in a knot around the intestine, through a hole in the mesentery. Margrave, of Newton Abbot, ⁶_{Oct. 14, '93} describes a case of impaction, in the small intestine, of a gall-stone the size of a bantam-egg. A large enema seemed to afford relief for an hour, when the symptoms became aggravated, the obstruction became complete, and the case ended fatally.

Treatment.—J. S. C. Williams⁶_{Mar. 3, '94} had under his care a child

of 8 months, who was suffering from acute intestinal catarrh with slimy, mucous stools and a characteristic tumor in the right iliac fossa. He had tried without avail kneading, inversion, injection of warm water, and insufflation of air. Laparotomy was not permitted. He at last determined to try the generating of gas within the intestine. He dissolved $1\frac{1}{2}$ drachms (6 grammes) of citric acid in $\frac{1}{2}$ pint ($\frac{1}{4}$ litre) of warm water, and in another vessel 2 drachms (8 grammes) of bicarbonate of soda in an equal quantity of water. Through a flexible catheter passed nine inches into the rectum he injected first the acid and then the soda. The catheter was quickly withdrawn and the nates held firmly together for two or three minutes. Very soon the abdominal tumor had entirely disappeared. The incessant vomiting ceased, and in two days the child passed a natural stool. The writer admits the possible danger of this treatment, but advocates it under circumstances such as existed in this case. Chalk, washing-soda, vinegar, or Seidlitz powder could take the place of the ingredients used. D. J. Caddy ²_{Jan. 30, '94} reports a case of intussusception, in a child of 6 months, with characteristic symptoms. A half-pint ($\frac{1}{4}$ litre) of warm water was injected without benefit. The next day, the child being in a condition of collapse, he repeated the process, using considerable force. After persevering for half an hour the intussusception was reduced and the child recovered in a few days. R. B. Hopkins ¹²¹_{Feb., '94} reports a case of intestinal obstruction beginning with violent pain in the right iliac fossa and followed by continuous vomiting. On the third day, when first seen, the vomiting was distinctly fecal. Dullness and tenderness were present. Morphine had no effect, nor had large injections of water or of oil. Persistence in treatment with each of these injections produced finally the evacuation of fecal matter with an agglomeration of grape-seeds. In a second case in which the stercoraceous vomiting began early and was obstinate, the same treatment eventually proved successful after five days. The author discusses the diagnosis of the condition and insists upon perseverance in the use of injections of water and of oil.

A. Swann ⁶_{Oct. 28, '93} reports a case of intestinal obstruction in which the method of abdominal taxis, by inversion and injection of water, was eminently successful. There was obstinate constipation with stercoraceous vomiting, severe pain, visible peristalsis, and other characteristic symptoms. As no tumor was discoverable he con-

cluded that the obstruction was probably the result of internal strangulation by constriction or some such cause. The patient was thoroughly etherized and her abdomen was then forcibly kneaded from side to side. She was then turned over and vigorously shaken backward and forward. Finally she was held feet uppermost and forcibly shaken up and down and given a copious enema while in this position. The proceedings lasted for half an hour. Gurgling began at the commencement of the taxis and increased constantly as it proceeded. By two hours later she had had three movements, and she went on to rapid convalescence.

Lewi, of New York, ⁵¹_{May, '94} relieved a case of obstruction, in a child 9 months old, by an enema of 900 cubic centimetres (29 fluidounces) of water. Ssewerin ⁸⁵⁹_{No. 3, '94} reports the relief of obstruction by faradization after all other methods had been tried without avail. Demons ¹⁸⁸_{May 13, '94} removed three coproliths from a child upon whom he had operated for an imperforate anus at its birth, a few years previously. Rafter, of Holton, Kan., ⁸⁰¹_{Apr. 7, '94} reports two cases of intestinal obstruction from excessive amounts of walnuts, grape-seeds, and grape-skins. Enemata of glycerin and olive-oil were successful in the first case after apparent peritonitis had set in; in the second, kneading of the bowels was added, with a similar result. E. Anderson ⁶¹_{Jan. 27, '94} insists upon immediate operation if the obstruction be sudden. He reports a number of cases, in one of which repeated enemata failed and operation was refused. There was no autopsy. In another a stone was found in the ileum after death. In a third, repeated injections brought away $\frac{1}{2}$ pint ($\frac{1}{4}$ litre) of cherry-stones. In a fourth, repeated doses of calomel removed a mass of tomato-seeds. In a fifth, the obstruction, removed by enemata and calomel, consisted of partially-masticated nuts bound together by the gum of raisins. Another case appeared to be suffering from slight diarrhoea, but the repeated administration of purgatives and enemata kept up for a month brought away a large amount of hardened fecal matter which had probably been accumulating for years. The last case reported was that of a child of 16 months, who was suffering from repeated convulsions apparently due to focal lesions, but who had no evidence of obstruction except constipation, which made purgatives always necessary to open the bowels. After some months she passed a large china button. It does not seem clear, however,

that the button had actually caused any obstruction. A. McC. Dallas ²³⁹_{Nov. 16, '93} describes a case of intestinal obstruction in a man who a month before had had an attack of severe abdominal pain, borborygmi, and tympanites relieved by the evacuation of the bowels by a purgative. He was quite well after this until he was seized with the same symptoms, which on this occasion were not relieved by purgatives, nor were the bowels opened. A tumor could be felt in the caecal region. The symptoms of obstruction set in rapidly with stercoraceous vomiting on the fourth day. Laparotomy was about decided on when two large enemata given at short intervals produced several large fecal movements with entire recovery in a few days.

Maiss ¹⁹_{Mar. 24, '94} was able to overcome obstruction in a child, with a tumor presenting in the left iliac fossa, by effleurage from left to right. Barder ¹⁹_{Mar. 24, '94} records two similar cases. R. Jeffreys ¹²⁹_{Aug., '94} reports a case of ileus with fecal vomiting, recovering after the administration of dosimetric granules of hyoseyamine and brucine. Rousseau, of Port l'Abbe, ²²⁹_{Mar., '94} reports a case of colitis in a young man of 19 years, with obstruction lasting a week, and vomiting, in whom recovery followed the administration of dosimetric granules of strychnine and hyoseyamus.

H. Nimier ²⁴³_{Feb., '94} states that as the diagnosis rests especially upon the two symptoms,—constipation and the failure to pass gas by the bowel,—an effort should be made to determine the presence or absence of these two. He favors the use of the electrical enemata of Boudet to determine whether or not there is absolute constipation. He would give opium in some cases, but would proscribe purgatives given by the mouth. L. Oser, ¹¹³_{No. 8, '94} J. Dornig, of New York, ⁵⁹_{May 5, '94} and Cullen, of Richmond, Va., review the diagnosis and treatment of obstruction. Welsford, of Dover, Eng., ¹⁰⁷⁷_{Dec. 13, '93} discusses obstruction due to gall-stones.

ENTEROPTOSIS.

Boas, of Berlin, ⁵⁷_{Feb. 11, '94} discusses this affection, citing Virchow and others who mention it, but giving Glénard the credit of first describing it as a morbid entity. As regards frequency, it is a condition often overlooked, and observed for the first time post-mortem. In rare cases the condition may be congenital. Predisposing causes may be relaxation of the abdominal walls from numerous

pregnancies or from rapid emaciation ; traumatism ; improper use of cathartics ; and, in addition to these general causes, there must be in every case a relaxation of the ligaments and the mesentery. The condition even when extreme may be without symptoms, but usually there exist signs of disordered functions which may affect the general nutrition. The appetite is generally lessened and there are sensations of weight and fullness with acid eructations. In some cases the bowels move daily, but more often constipation prevails, sometimes alternating with diarrhœa. Excessive flatulence is usual, and not rarely there is membranous enteritis, the latter probably due to the flexures which produce arrest of fecal masses, these in turn causing inflammation. As a result of these abnormal conditions there are loss of flesh and a feeling of weariness, and the patient has the appearance of one suffering from a wasting disease. Nervous symptoms are marked, with headache, loss of sleep, and other sensations which might lead to a diagnosis of neurasthenia or hysteria. The course of the disease is chronic. If one of the kidneys is the dislocated organ, there may be development of intermittent hydronephrosis. The right kidney is the organ most frequently out of place, and three degrees of dislocation are referred to : (1) in which only a part of the kidney can be felt and it is movable with respiration ; (2) in which the kidney can be palpated in all its extent and is freely movable ; (3) in which the kidney lies practically in the abdominal cavity and is fixed. Glénard's theory of the course of events is that, through a twist in the transverse colon, feces accumulate and tension is made on the colico-hepatic ligament ; the hepatic flexure disappears, the remaining ligaments and the mesentery become relaxed, and finally there is a complete splanchnoptosis, including the stomach, liver, spleen, and kidneys. Boas does not think that the facts bear this out. In cases of prolapse of the stomach and large intestine there is often atony of these organs, with resulting dilatation and intestinal catarrh. In the course of the disease there are days of comfort alternating with periods of distress, depending largely on the degree of activity of the patient, work greatly increasing the pains. The cord felt in the upper part of the abdomen, which Glénard designated the cord of the transverse colon, Boas and Ziemssen³¹ assert is the pancreas, palpable by reason of the sinking of the stomach. In the diagnosis all the

points must be weighed; the digestive disturbances, the unfavorable influence of bodily exertion, the variation in the complexus of symptoms, the nervous symptoms, and a careful physical examination. In the latter the position of the stomach may be made out by causing increased amounts of water to be drunk and noting the lower border of dullness as contrasted with the tympany of the colon, which may be distended beforehand with air or gas. The reverse may also be practiced, and with 200 to 300 cubic centimetres ($6\frac{1}{2}$ to $9\frac{1}{2}$ fluidounces) of water a splashing sound will be heard, double the amount being required in the normal condition. As an aid to the diagnosis, Lahusen,³⁴_{Feb. 6, '94} mentions the tenderness on pressure over the solar plexus and the existence of tender points along the spine. It may be difficult to make a differential diagnosis from neurasthenia or hysteria. In the treatment the bowels must be moved regularly. Supporting-bandages may be necessary, but the abdominal walls must be toned up by massage, electricity, and hydrotherapy. The diet must be such as leaves considerable residue. In decidedly nervous cases, Weir-Mitchell's rest-cure is of great value. Medicines play a secondary part in the treatment, but the bromides, belladonna, morphine, etc., may be used cautiously. In decided atony with flatulence and fermentation, resorcin, strychnine, and bismuth in combination are valuable. If the kidney is the only organ dislocated, nephrorrhaphy or nephrectomy may be performed. Mathieu,¹⁰⁰_{Apr. 5, '94} thinks that many of the symptoms set down by Glénard as belonging to the early stage may be found in other conditions. He agrees in general, however, with Glénard, especially as to the frequency of movable kidney.

TUMORS.

Casteuil,⁴⁶_{Nov. 15, '93} reports a case of immense sarcoma with secondary nodules everywhere in the abdomen. The oldest part seemed to be that arising near the bladder, and, as the seminal vesicles could not be found, these were possibly the starting-point. Bernard, of Paris,⁷_{No. 4, '94} reports a diffuse sarcoma of the peritoneum, compressing the ureters and causing death by uræmia. Jallaud,⁶_{Apr. 21, '94} had a case of lymphosarcoma attached to the bladder and intestine, with secondary nodules in the mesenteric glands and intestine. The patient was a boy of 6 years, with a history of trauma one week before the illness began and six weeks before death.

Adami, of Montreal, ²⁸²_{Feb., '94} showed the omentum and mesentery from a patient who died of acute peritonitis. Sections of the tissues showed sarcomatous stroma with, in some places, alveoli filled with epithelial cells, thus making it a mixed carcinoma and sarcoma.

Salles, of Lyons, ²¹¹_{Dec. 31, '93} reports two cases of ascites appearing without evident cause. In the first case the fluid disappeared under treatment, and a year later the patient died of miliary carcinoma. In the second case two months of treatment relieved the ascites, and then an exploratory laparotomy revealed the presence of a litre (quart) of hæmorrhagic effusion, with cancer of the peritoneum and liver. The patient died fifteen days later. From these cases Salles argues that the ascites of cirrhosis is not the only curable one, and that tubercular peritonitis and cirrhosis of the liver may easily be confounded with cancer of the peritoneum.

Jonchères ¹⁸⁸_{Mar. 4, '94} describes a colloid cancer affecting the large intestine and stomach, which were adherent to and communicated with each other. Lannois and P. Courmont, of Lyons, ⁹²_{Apr. 10, '94} observed a patient in whom cancer of the œsophagus was diagnosed. A small tumor felt in the epigastrium was supposed to be a secondarily-involved gland. At the necropsy the lower part of the œsophagus was found to be the seat of a pavement epithelioma. In the duodenum, surrounding, but not obstructing, the canal of Wirsung, was a primary cylindrical epithelioma. Such cases are very rare, the authors having found only thirteen on record.

Weichselbaum ⁵⁷_{Dec. 24, '93} demonstrated before the K. K. Gesellschaft, in Vienna, numerous polypi in the large and small intestines, and three deposits of cancer, one in the cæcum, one in the transverse colon, and one in the rectum,—all in one patient. The polypi resembled Lieberkuhn's glands, and the cancer was an adenocarcinoma, probably having started from the polypi. The focus in the cæcum was the oldest, and the others may have been metastatic deposits. The clinical symptoms of the case were as follow: After a rectal stricture had been dilated, an abscess formed and opened just above Poupart's ligament on the right; later, ileus called for laparotomy, when the node in the transverse colon was resected, as it had produced stenosis. Weinlechner infers that dilatation of strictures and even digital examinations of the rectum

are not without danger, as microbes may be pressed into the intestinal wall.

Pye-Smith, ²_{Dec.9,'93} exhibited a carcinoma of the pylorus and a second growth in the duodenum, as a rather rare exception to the general rule that parts frequently the seats of primary cancer are rarely affected by secondary growths. J. A. Bracque ¹²⁶_{Jan.15,'94} points out the rarity of cancer of the intestine in adults from 20 to 30 years of age, but admits its possibility and the difficulty of diagnosis. Males are more prone to it than females. Lund, ⁹⁹_{Aug.30,'94} of Boston, read the notes of a case of cancer of the sigmoid flexure, with perforation. Cancer of the peritoneum ⁴⁶_{Dec.1,'93} in a child was diagnosed by the ascites, the nodes felt after paracentesis, the constipation, the cachexia, and the absence of fever. The diagnosis was confirmed post-mortem.

Leydhecker ²⁰_{V.84,No.1,'93} reports a case of gastric carcinoma involving secondarily the lymph-glands of the abdomen and thorax and the thoracic duct as far as the eighth rib. The case was accompanied by peritoneal exudation containing fat. This is the sixth case reported of secondary involvement of the thoracic duct, and the first where the primary focus was in the stomach. Williams and Adami ²⁸²_{July,'94} showed to the Montreal Medico-Chirurgical Society specimens of lipomatous angiomas affecting the descending colon. Moizard ²¹²_{Apr.10,'94} quotes Potain's case and reports one of a girl with a phantom tumor of the abdominal muscles. E. Witte, of Berlin, ⁶⁹_{July 5,'94} reports a case of fibrolipomatous tumor springing from the subserous layer of the mesocolon. The tumor was removed by laparotomy and found to be undergoing myxomatous degeneration, being the size of a man's head and containing numerous small cysts. A. Lode ³¹⁹_{Sept.1,'94} reports a case of a subserous myoma of the ileum, which at first had given rise to symptoms of occlusion, and later to continual diarrhœa, vomiting, fever, and loss of strength. The tumor was adherent in the right iliac fossa as the result of a localized peritonitis, had undergone retrogressive changes, and was partly broken down and gangrenous. R. Marie, of Paris, ⁷_{No.11,'93} reports a case presenting a tumor in the right iliac fossa. The portion of the bowel containing it was resected, but the patient died from peritonitis. The tumor was found to be tubercular in nature.

Osler ¹_{Feb.et seq., '94} contributed a valuable series of lectures upon the

diagnosis of abdominal tumors, giving the details of sixty-seven illustrative cases. Among the cases involving the intestines and peritoneum are several of cancer of the cæcum and colon, two cases of tubercular tumor of the omentum, and several abdominal growths of doubtful nature. In discussing the symptoms of cancerous tumors of the intestines, he refers to their occurrence in adults as young as 29 or 30 years; the presence of marked intestinal features,—gripping, colicky pains, with, in some cases, diarrhœa, in some obstruction; the frequency of hæmorrhage, the blood being bright and unchanged if the seat of the growth is the sigmoid flexure, and dark if the tumor is at the cæcum or hepatic or splenic flexures. The diagnosis may be easy or very difficult. The omentum may form a tumor in the upper part of the abdomen, being rolled or puckered up by tubercular or chronic proliferative peritonitis.

Greig Smith,²_{Jan. 27, '94} read a paper on the so-called spontaneous disappearance of solid abdominal tumors, and described three cases, in each of which, after opening the abdomen, the tumor was diagnosed as malignant and the operation abandoned after enterostomy in one, the patients recovering and the tumors slowly disappearing. Fistulæ formed in the two others after operation. These tumors were supposed to be due to the process of phagocytosis, which caused a heaping up of embryonic protective cells around a minute fistulous opening in the intestine. Cure was accidental, but not spontaneous, depending, in one case, on a diversion of the intestinal contents, and in the two others on an external opening of the fistula. In the discussion, Priestly held that the tumors were probably inflammatory, and disappeared after the irritant was removed.

APPENDICITIS.

Etiology and Pathology.—E. Hodenpyl,¹_{Dec. 30, '90} contributes a valuable paper upon the etiology of appendicitis. A review of the published cases in which bacteriological studies have been made shows only twenty-four, in all, up to the time of the writer's communication, and in all of these the bacillus coli communis was found in the exudate. In only two cases was it associated with any other micro-organism,—once with the bacillus pyogenes fœtidus and once with a streptococcus. The writer describes the tech-

nique of the bacteriological study in 11 new cases. In 10 of these he found the bacillus coli communis in pure cultures, and in the eleventh this was combined with the streptococcus pyogenes. He made an effort to determine what relation the colon bacillus bore to appendicitis. He found the microbe in pure culture in five normal appendices. In 10 cases cultures were made from the normal abdominal cavity after death; in 9 of these the result was negative, and in 1, twenty-two hours after death, there were a few colonies of the colon bacillus. In 2 cases of peritonitis from perforation of the stomach and of the uterus, respectively, he obtained the colon bacillus in pure culture, while in 5 cases, due to causes not connected with the bowel, other germs only were present. He abstracts from medical literature the most important of the instances in which the colon bacillus was found in connection with various pathological processes other than appendicitis, and remarks that the occurrence has nearly always been associated with some lesion of the intestinal wall, which has allowed the bacilli to pass through it, although, under certain conditions, they may pass through without this solution of continuity. A review of some of the published inoculation experiments with this germ shows that it produces in animals inflammation, abscesses, and sometimes general septic infection. Among other possible causes of appendicitis he refers to tubercular and typhoid ulcers, concretions, and actinomycosis, although he can find no instance of the latter disease reported. He concludes that several factors must be taken into account in considering the etiology of appendicitis,—strictures, kinks, twists, ulcerations, concretions, and malpositions appearing to act as predisposing causes. As exciting causes we have bacteria and perhaps, also, chemical factors, associated with faecal matter in cases in which the appendix is perforated. While it seems that several species of bacteria may act as exciting causes of the disease, the colon bacillus seems to be the most important.

G. R. Fowler, ¹_{Oct. 14, '93} convinced of the influence of the bacterium coli commune in producing appendicitis, records eight cases operated on by himself and taken at random for the purpose of bacteriological study. Seven of the eight gave pure cultures of this germ, while in the eighth the bacillus pyogenes fœtidus was also present. In one instance there was no pus nor serum found. The tip of the

appendix was adherent to the cæcum, and the cultures were obtained from the patch of lymph upon the latter at this spot. This suggested that the germs had penetrated the cæcum and infected the appendix from outside in this way.

As regards the etiology of typhlitis, constipation, so often considered to be a predisposing factor, is not generally the cause, according to Azoulay,¹⁶⁸
Jan. 1, '94 but rather one of the effects. Foreign bodies are absent in many cases of typhlitis, but in almost all cases of appendicitis a small faecal concretion is found. The author considers both typhlitis and appendicitis to be forms of septic inflammation, clinically and pathologically, the agent being probably the bacillus coli communis, sometimes aided by other bacteria, making the infection complex. He suggests, as an explanation of the virulence of a microbe normally found in the intestine, that the epithelium is injured by faecal masses or other foreign bodies, thus removing the barrier to the entrance of the microbe.

Jessop, of Leeds,²
Mar. 24, '94 gives the notes of two cases of appendicular colic upon which he operated, the distal extremity of the appendix in each case being dilated and filled with mucus, while the orifice of the appendix was so narrowed by a stricture as scarcely to admit a fine bristle.

Farnum, of San Francisco,¹⁴⁷
Mar., '94 observed an anomalous cæcum and appendix which were situated on the quadratus lumborum muscle, an inch and a half above the right iliac crest. In another case the sigmoid flexure was on the right, in contact with the cæcum. F. N. Hunt, of Blue Earth City, Minn.,¹⁰⁵
July 1, '94 reports a case of recurrent appendicitis with six attacks, each one more severe than its predecessor. The diagnosis was made more from the history of the previous attacks than from the physical examination, the pain and tenderness being more marked in the epigastrium. Considering appendicitis as an exudative inflammation, he classes it as a surgical affection. Griswold, of Sharon, Pa.,⁶¹
Dec. 16, '93 reports a case of general peritonitis caused by an enterolith the size of a filbert, which had passed through a perforation in the distal end of the appendix. Lane, of London,²
Feb. 17, '94 read the notes of a case of appendicitis in a young man who had had several previous attacks. In the last one an abscess formed and ruptured, causing general, acute, suppurative peritonitis. Operation was followed by speedy recovery. Fraser Wright,³⁶
July, '94 in a fatal case

which had lasted seventy-two hours, found a perforation midway between the tip and the base of the appendix. Stanley ³²_{Apr., '94} exhibited to the Birmingham Society a cæcum perforated about an inch from the ileo-cæcal valve, communicating with a sinus which led up behind the ascending colon. There had been a sudden, severe pain in that region, with fever, six months before the death of the patient from pneumonia. Lucas also showed to the society an appendix with faecal concretions taken from a case which had suffered from vomiting and obstruction of the bowels for eight days. There had probably been a volvulus of the small intestine.

F. E. Peckham ⁹⁹_{Jan. 18, '94} gives the details of a case of appendicitis in which, after apparent resolution on the fourth day, there was a relapse and death on the sixth day of the disease. A post-mortem examination showed pus free in the abdominal cavity, with an ulcer of the appendix and a second one of the ascending colon. He thinks this indicated that the case could have been saved by operation had it been done before the relapse occurred. Lemariey ¹⁰⁰_{Dec. 5, '93} reports a case of appendicitis, followed by a double abscess,—one in the scrotum, the other in the retrocæcum, the two being connected by the inguinal canal. There was also a purulent pleurisy, but no perforation of the diaphragm. The writer states that abscess of the scrotum consecutive to appendicitis is rare, and that very few cases have been reported. Therig ³¹⁹_{Feb. 3, '94} reports two cases of paratyphlitis in women with rupture into the bladder. In the first the rupture occurred on the nineteenth day, and in the second not until after two and a half months. The question has been raised as to the frequency of appendicitis in the negro, and J. McF. Gaston ⁹_{Oct. 7, '93} states that he has had a number of negro cases under his care in which there were evidences of disease in the right iliac fossa, and in one of which he operated and found the inflammation of the appendix present. He also refers to another case under the care of a colleague. R. M. Hand ⁹_{Oct. 7, '93} reports a case with operation performed, and J. F. Baldwin ⁹_{Oct. 7, '93} has had two cases.

D. W. Styer ¹⁴⁴_{Dec., '93} relates a case of typhlitis apparently due to impaction consecutive to the ingestion of numerous grapes with their seeds. There was increasing pain with tenderness and swelling in the right iliac fossa, with the presence of a doughy mass. The impaction was so complete that gas could not pass. Flushing

of the colon was at last followed by evacuation and a disappearance of the swelling.

Diagnosis and Prognosis.—Richardson, of Boston,⁵_{Jan., '94} gives observations from personal experience of one hundred and eighty-one cases of appendicitis. “With very rare exceptions, a diseased appendix is the cause of all peritonitis, local or general, occurring in males.” The diagnosis of appendicitis rests upon the presence of (1) pain, which is not necessarily confined to the right iliac fossa; (2) tenderness, usually more marked over the appendix; (3) vomiting, present in almost every case; and of grave significance when it becomes of a coffee-ground color, even if not stercoraceous; (4) diarrhœa, present in a large number of cases in the beginning. Perforation, usually supposed to occur on the fourth, fifth, or sixth day, may occur at the onset, and probably does so in those cases beginning with sudden pain. The pulse is of value from a prognostic point of view, a rate of 120 indicating a considerable infection, and, according to some, being an absolute indication for operation. Too much stress must not be laid on the temperature, as recovery may follow a temperature of 105° F. (40.6° C.) and death may occur with one nearly normal. Distension of the abdomen depends for its importance upon its cause. Opium may cause it, or gas may form. If peristalsis is not inhibited, which may be determined by auscultation, no alarm need be felt. Distension due to local infection is of the gravest import. A rectal examination should always be made in doubtful cases. If the appendix overhang the pelvic brim there will be marked rectal tenderness. Decided leucocytosis has been present in every case of perforation but one. The same author⁹⁹_{Jan. 18, '94} says that within two weeks he had operated upon three cases of appendicitis in which the diagnosis was very difficult indeed, in spite of what has been said to the contrary. In two of them all the symptoms were in the region of the liver. He does not think that peritonitis is often caused by the operation for appendicitis, for the peritoneal infection already exists. Why one case dies and another recovers depends probably on the variety of micro-organism present.

Edebohls, of New York,⁵_{May, '94} urges the importance and possibility of palpating the appendix to determine whether or not it has been enlarged by inflammation. Struthers³⁶_{Nov., '93} describes the varieties of the appendix vermiformis, cæcum, and ileo-colic valve in

man. Cuffer ¹⁴_{June 24, '94} states that hæmorrhoids may give rise to pains which may lead one to suspect appendicitis.

Azoulay ¹⁶⁸_{Jan. 1, '94} gives the notes of typical cases of typhlitis and appendicitis, and compares the two conditions. The onset of typhlitis is gradual, resembling typhoid fever; the tumor is a boggy mass, longest in the vertical direction; convalescence is slow; relapses infrequent; abscess rarely forms; perforation is rare and the whole process is usually benign. In appendicitis the invasion is usually sudden and, if seen early, the tumor is small, low down, and situated transversely; the condition is much graver than typhlitis, the signs being those of a beginning peritonitis, with pain, fever, and vomiting; these may increase and then subside, leaving induration or a peri-appendicular abscess; perforation is of frequent occurrence, and, when rapid, causes generalized peritonitis; when slower, the ulceration causes adhesions to form and an abscess results; the appendix may undergo gangrene and the abscess may be gaseous; finally, septicæmia may occur, with pylephlebitis or abscess of the liver.

G. F. Shrady ⁵⁹_{Jan. 6, '94} writes an article upon the diagnosis of appendicitis based upon the analysis of symptoms in three hundred recorded cases and upon personal observation. The first and most important symptom is pain in the right iliac fossa, which is present in every case with but few exceptions. Tenderness at McBurney's point he regards as important if associated with other symptoms, but not as indicative of any one particular pathological process of the appendix more than another. The real seat of tenderness is the appendix itself. Circumscribed muscle-tension in the right iliac fossa is an early symptom stated to be present in about 40 per cent. of the cases which he collected, and not stated to be absent in the others. Tumor in the right iliac fossa rarely shows itself before the third day of pain and tenderness, when agglutination and circumscribed effusions have occurred. Swellings which come on slowly are firm and distinctly circumscribed and less liable to rupture. A tumor may, however, be due to accumulation of feces in the cæcum. Dullness on percussion, when present at all, is rarely recognized before the fourth day. Fluctuation does not generally appear until the second week, and is sometimes recognized by rectal examination. Œdema of the overlying integument does not occur until a paratyphlitic abscess has formed. Generally

the pulse is slightly accelerated and the temperature 100° to 101° F. (37.8° to 38.3° C.), the increase of both of these, with increase of other symptoms, indicating a dangerous condition. Danger may exist, however, without being shown by pulse or temperature. Pulse, temperature, and pain may decline, marking the occurrence of effusion. This is a deceptive calm. Vomiting is an early symptom. It may indicate commencing inflammation or may show that perforation has occurred. The sudden access of intense localized pain indicates a dangerous change in the local conditions.

Kirstein³⁹_{Oct., '93} describes a case of perityphlitis followed by striæ in the skin of the back, resembling in appearance the lineæ albicantes of women who have been pregnant. These striæ were perpendicular to the axis of the body, and were preceded by dragging pains in the shoulder. Similar cases are on record, always following some grave abdominal affection. J. Burney Yeo²_{June 16, '94} gave a clinical demonstration of a case of rheumatic perityphlitis. There was much tenderness in the right iliac fossa, but no tumor nor dullness. An arthritis appeared which yielded rapidly to the salicylates, but these depressed the heart so much that they were discontinued. In a few days the symptoms in the right iliac fossa increased and a creaking friction was felt there. The salicylates were begun again with a rapidly-beneficial effect, the temperature falling to normal in twenty-four hours and the signs disappearing. In the treatment purgation, opium, and the local application of cold were carefully avoided. Haig, of London,²_{June 30, '94} reports a similar case which yielded to the salicylate of soda.

In the study of the clinical histories of 88 of the many cases of perityphlitis in the clinic of Nothnagel during the last ten years, J. Mannaberg³¹⁹_{Mar. 10, '94} noticed that in 10—i.e., 11 per cent.—there was mentioned an accentuation of the pulmonary second sound. Of 13 cases seen after his attention had been drawn to the matter this accentuation was marked in 4, and in 7 others the valve-sound was distinctly louder than at the aortic cartilage. He concludes that the accentuation of the pulmonary second sound is commonly present in perityphlitis, but he is unable to suggest an explanation for the occurrence.

O'Brien¹⁰⁵⁵_{Oct. 1, '93} reports three cases of perforation of the cæcum and appendix, the first of which illustrated the paralysis of the intestine which may attend appendicitis. The symptoms began

insidiously with constipation and some pain, while later there were also the signs of strangulation and obstruction, and finally evidences of perforation and collapse. The autopsy revealed an encysted abscess which had burst into the peritoneum. The appendix was dilated and clogged at one end by faecal matter. The second case was one of abscess from a sloughing appendix. Operation was followed by recovery. The third was a retro-peritoneal abscess in connection with the caecum, with death from septic poisoning after perforation.

The classification of appendicitis on a clinical basis is given by Tayle,⁸⁶⁸ as follows: (1) appendicitis with acute general peritonitis; (2) appendicitis with abscess-formation; (3) non-suppurative appendicitis, with or without plastic peritoneal exudate, the so-called appendicular colic. In their course, prognosis, and treatment these forms vary so much that a diagnosis of appendicitis at the onset is of the highest importance, but, even when made, there is no certain way of telling which form the inflammation will take. Among the points to be considered in the differential diagnosis of peri-appendicular abscess are typhlitis, iliac adenitis, abscess of the abdominal wall, and, in women, affections of the uterine appendages.

Benoit, of St. Albert,¹²² gives the notes of a case of appendicitis treated medically, and lays stress on the diagnostic value of McBurney's point, pain on pressure in typhlitis being dull, in appendicitis sharp. Typhlitis is more a disease of corpulent aged individuals leading a sedentary life, while appendicitis is largely an affection of young adult males. Habitual constipation is generally the cause of each disorder, often forming stercoral typhlitis, which yields readily to purgation. If, however, a foreign body, such as a faecal concretion, enter the appendix, an appendicular colic is set up with lively pain, which ceases when the foreign body is expelled; but if it remain, appendicitis ensues, with its various possibilities. Peritonitis almost invariably follows, either localized or general, the latter being an absolute indication for laparotomy. In the case cited, after the temperature had returned to normal, there was a subsequent rise, which, although there were no joint-symptoms, Benoit considered to be rheumatism, as the fever disappeared under alkaline treatment.

Treatment.—The discussion on this subject still continues

with much earnestness, although the lines are not now drawn so strictly between those who would operate in every case and those who would not operate at all. The general consensus of opinion is to operate in all cases where perforation occurs. Just how to decide when this happens is not yet clearly made out. As Richardson⁵_{Jan., '94} says, "the most positive assertions come from those with the most limited experience," and he confesses to great uncertainty after an experience of one hundred and eighty-one cases. When circumscribed peritonitis and abscess exist, the indication is clearly to drain. It is not wise to persist in breaking up adhesions for the sake of removing the appendix. The only objection to simple incision and drainage lies in the fact that there may be more than one abscess-cavity. Operation is called for immediately in a sudden severe attack of appendicitis with pain, vomiting, more or less distension and high pulse, with localized tenderness. In such a case the appendix is usually perforated, and the bacteria are very virulent, often producing a fatal peritonitis, in spite of very early operation. For relapsing appendicitis, the operation between attacks is practically safe. For the treatment of distension in peritonitis, the salines are of no use except very early; in appendicitis they are decidedly injurious. Perforation of the appendix may occur at any point, wherever the fecal concretion may happen to lie. An editorial⁸⁰_{Nov. 15, '93} supports Richardson's position on the use of salines. S. G. Gordon,⁹⁹_{Dec. 7, '93} on the other hand, strongly urges their free and early use, not only for the removal of toxins by purgation, but on account of the derivative action and the consequent removal of exudates. He believes that when peritonitis is beginning as a result of perforation and exudate is being poured out, the treatment will end the attack in nine out of ten cases by absorbing the exudation before it is converted into pus. Operation at this stage would merely remove the original source of the poison, but not the poisonous matter already escaped. There is no danger of the escape of fecal matter, for the opening to the appendix from the intestine is already shut off by inflammation. He does, however, strongly favor operation after convalescence from a well-marked attack.

Perier⁸⁰_{Aug. 15, '94} advises recourse to surgery if opium by mouth and enemata of borax solution do not produce amelioration in two days. F. H. Knickerbocker, of Henderson, Minn.,²³¹_{Sept., '94} reports a

case treated by salts, quinine, and opium, the attack lasting five days. He inclines to the medicinal treatment, unless the services of a skilled surgeon can be obtained, claiming that careful medical treatment will give better results than the average surgeon can expect. II. W. Whitaker, of Columbus, O., ²³³_{Apr., '94} urges a less hasty recourse to surgical interference for typhlitis. He advises small doses of opium and calomel and, if improvement do not follow in a few days, surgical procedures. Moritz, ²¹_{May 12, '94} in reporting forty-five cases of perityphlitis, with one death, states that the dangers of the disease have been exaggerated by those who would urge surgical interference. The medical treatment for typhlitis and appendicitis, recommended by Azoulay, ¹⁶⁸_{Jan. 1, '94} is practically identical,—five or six leeches immediately; avoidance of purgatives early, their cautious use later, when pain has disappeared, belladonna being the most useful drug for this purpose; in the acute stage, opium. Surgical intervention is rarely necessary in typhlitis, except when abscess forms. In appendicitis, with perforation and peritonitis threatening, immediate laparotomy should be done. It is quite a delicate question in each case when to operate. Grasset, ³⁵_{Dec. 6, '93} maintains that the medical treatment of typhlitis should vary with the form of the disease. In typhlitis with persistent cæcal engorgement, medical treatment will probably fail and surgical measures be necessary. In recent typhlitis with acute exacerbations he gives full warm baths, lasting half an hour; every hour a teaspoonful of a purgative mixture made up of 1 part each of castor-oil and oil of sweet almonds and 2 parts of syrup of lemon, until active purgation is established; mercury and belladonna ointment over the cæcum, and then hot linseed-meal poultices. For recurrent typhlitis there should be treatment in the intervals, with a diet that leaves little residue, and with counter-irritation and belladonna-ointment over the cæcum, the bowels being kept regulated and intestinal antiseptics administered.

Shrady, ⁵⁹_{Jan. 6, '94} advises early operation in clear cases. In the many doubtful ones the line has not yet been drawn between watchful patience and unwarranted exploration.

PERITONITIS.

Balls-Headley, ²⁸⁵_{Oct 15, '93} defines peritonitis as “an evolutionary, mechanical, symptomatic inflammation of the serous membrane

covering the abdominal and pelvic organs, producing an exudate of a quality sympathetic with the causation." Haegler²¹⁴_{Nov. 15, '93} reviews Tavel and Lanz's contribution to the etiology of peritonitis. Peritonitis may occur with or without perforation. Without perforation it may be the result of (1) a proliferation of bacteria (as in puerperal peritonitis), (2) a penetration of bacteria, and (3) a penetration of chemical products. With perforation it may be the result of (4) invasion of chemical products (bacterial toxins, intestinal ferments, etc.), (5) invasion of bacteria, and (6) invasion of solid foreign bodies. Experimentally they found that no one of these factors alone could cause peritonitis, and that there must be, for bacterial activity, a predisposing cause in the injury to the epithelium and the consequent chemical inflammation. No one form of bacteria played a specific part in the etiology, but the most constant and frequent micro-organism was the bacterium coli commune. This seemed to be rather a family, the members of which differ in reactions, size, and formation of capsules, vacuoles, and cilia, than a group of bacteria all of which possess the same peculiarities. The bacteria causing any certain attack of peritonitis neither indicate from what part of the alimentary tract they come, nor do they determine the prognosis.

Barbacci³⁷⁶_{A. 47, P. 4} made a bacteriological study of 13 cases of peritonitis following perforation. Among the cases were 7 from typhoid ulcers, 2 from gastric ulcers, 1 from perforation of the vermiform appendix, 1 from intestinal strangulation, 1 from an ulcer of the cæcum. A cover-glass preparation of the exudate showed the presence of many forms of micro-organisms, but the bacterium coli commune was the only one that could be cultivated, except in 2 cases, when Fraenkel's diplococcus was found. In 8 out of 11 cases cultures from the blood gave the bacterium coli commune, the cultures remaining sterile in the other 3. The floor of the perforated ulcer was examined in 5 cases, and in all the bacterium was found. Experiments on dogs gave similar results. The author explains the growth in cultures of the colon bacillus alone by experiments which show that the other micro-organisms are killed in the exudate poured out by the peritoneum. The presence in the blood of the colon bacilli is probably due to their wandering after the death of the individual. The colon bacilli alone were not enough to produce peritonitis experiment-

ally. There must be a great mass of them in an irritating fluid, and when this combination is injected into the peritoneal cavity the process seems to be a general septicæmia with local peritoneal manifestations. Perforative peritonitis was produced experimentally on 7 dogs, and from eight to fourteen hours after perforation the intestinal wound was closed and nothing else done; 2 recovered completely, and in the others death was much delayed, thus showing that the main factor in the fatal result is the constant infection through the persisting perforation. The author believes that the intestinal gases also play an important part. He observed that the bacilli underwent many changes in form and characteristics, but not sufficiently to proclaim the various forms as separate species.

Walthard, ⁴¹_{No. 70, '94} from experimental studies in the etiology of purulent peritonitis, believes that strictly-aseptic laparotomy is never followed by peritonitis, provided the organs opened and containing infective agents are closed so that all communication with the peritoneal cavity is shut off. If the peritoneum of a rabbit is exposed to the air for any time, at any particular part, or to an antiseptic, that part on closure adheres at once to the serosa opposite, but peritonitis does not ensue unless micro-organisms have gained access; a very small quantity of these sufficing to set up a general purulent peritonitis. If, during a laparotomy, the peritoneum is covered by gauze compresses soaked in saline solution, no adhesions occur; and if a small quantity of germs gain access, peritonitis does not necessarily develop. Injury to the serosa by mechanical appliances, such as sutures, forceps, etc., predisposes to peritonitis less than exposure to the air does.

Tapié, of Toulouse, ¹⁰⁸⁸_{Mar. 4, '94} reports a case of general purulent peritonitis, in an infant 22 months old, opening at the umbilicus and followed by recovery. He distinguished it from tubercular peritonitis and from peritonitis following perforation, classing it, for want of a better term, as idiopathic. In 25 cases collected from literature 15 were in girls; 10 of the 25 opened at the umbilicus and 8 of these recovered.

Samson, of Windsor, Ont., ²⁰²_{Feb. 25, '94} maintains that some cases of peritonitis must still be called idiopathic, for want of a better term. He mentions an epidemic in the village of Morpeth, in 1886, in which there were 30 cases in two months, with a mortality of 50

per cent. The onset in each case was sudden, with epistaxis. No one starting-point could be located for the peritonitis, which was general. Most of the fatal cases died on the second day. In those that recovered convalescence was not begun for two weeks.

Potain ²¹²_{Dec.10,'93} calls attention to the difficulty of exact diagnosis of abdominal conditions, and cites two cases which came under his observation. In one the patient was in a typhoid state, and congestion of the lungs developed in a few days. At the necropsy a broncho-pneumonia was found, and also a focus (supposed to be of pneumococcal origin) of pus, subdiaphragmatic and near the spleen, the symptoms of which had been masked by those pointing to the thorax. The other case was one of atrophic cirrhosis, which at one time was thought to be complicated by tubercular peritonitis, but by aspiration a quantity of sanguinolent fluid was drawn off, and cancer was thought a possibility. At the post-mortem an hæmatoma was found in the parietal peritoneum.

Roswell Park ²⁰²_{Jan.25,'94} classifies the forms of peritonitis clinically, anatomically, and pathologically. Clinically, the disease is idiopathic, consecutive, perforative, traumatic, chronic, tubercular, malignant, latent, and foetal. This classification is based upon external appearances and is, he admits, notoriously misleading. Anatomically, it is general or diffuse, circumscribed or local. Pathologically, it is aseptic, infectious, and specific. As a result of his review of the subject and his own experiments he concludes (1) that there is no such thing as an idiopathic peritonitis; (2) that many cases of non-traumatic peritonitis have their origin in the female pelvic organs, and are due to infection by the streptococcus or staphylococcus, or in some cases to the colon bacillus; (3) that cases due to perforation are to be classed among septic or putrid forms; (4) that peritonitis due to internal obstruction or strangulated hernia is usually the result of a colon infection; (5) that cases arising in ways other than those mentioned are nearly always dependent on the appendix, and generally are instances of pure colon infection; (6) that most of these are fatal unless surgical procedures are used; (7) that in every case of peritonitis in which the cause is evident the ileo-cæcal region should be carefully examined and, if suspected, explored surgically.

Treves, ²_{Feb.,Mar.,'94} in the Lettsonian Lectures on Peritonitis, deals with the subject in a scholarly manner, discussing the purpose of

inflammation, showing its beneficent action, and emphasizing the fact that most of the fatal cases of peritonitis have but a slight degree of inflammation, and present rather the clinical picture of toxæmia. The peculiarities of the peritoneum are: (1) its enormous surface-area; (2) its great powers of absorption; (3) its limited resistance to septic organisms and their products; (4) the rapidity with which it heals; (5) the varying degree of vulnerability in different parts; (6) its great sensitiveness.

G. Lasserre, of Paris, ²¹²_{Sept. 10, '94} has studied the clinical type of subacute peritoneo-pleural tuberculosis of benign form. This is primary and is to be distinguished from the secondary form, in which the prognosis is grave. It is moderately sudden in onset and may be accompanied by slight fever. The effusions last for some weeks or even months and then disappear spontaneously, although in some cases they must be removed mechanically. Adults in apparently good health are most often attacked. Pain is not great, effusion not very abundant. It must be differentiated from ascites in hepatic disorders and cancer of the peritoneum and pleura. Comby ¹⁷_{Nov. 9, '93} reports one case of tubercular peritonitis with ascites, and another of pleuro-peritoneal tuberculosis, each recovering without surgical interference. Collin, ²¹²_{Dec. 10, '93} in a patient with pulmonary and peritoneal tuberculosis, succeeded in overcoming, with a large purgative enema, intestinal obstruction after faecal vomiting had occurred. By means of subsequent local and constitutional treatment all signs of the tubercular processes disappeared. Demailer ⁵⁹_{Feb. 3, '94} reported a case of non-exudative tubercular peritonitis in which laparotomy was followed by temporary improvement only, the patient dying two-months later. He concludes that the non-exudative, unlike the exudative, form should be considered inoperable. Charrin and Veillon ³¹_{Feb. 3, '94} report an interesting case of peritonitis in which pus obtained by aspiration one hour after death exhibited only pneumococci, although there had been no pneumonia. The pus obtained at the autopsy, however, twenty-six hours after death, showed only the colon bacillus in the cultures. Only by inoculation in mice could the pneumococcus be found again. There had evidently been a passage of the colon bacillus from the intestine to the peritoneum after the death of the patient. This shows the necessity of care in drawing conclusions from bacteriological observations made post-mortem.

Stewart, of New York, ¹_{Aug. 25, '94} reported a case of peritonitis following a kick of a horse. Thirty perforations were found at the autopsy. A. Jaenicke, of Berlin, ⁵⁹_{Apr. 21, '94} claims that in 60 to 70 per cent. of women between 20 and 40 years of age, who are set down as hysterical, careful examination would reveal old peritoneal adhesions. The cause in about 75 per cent. is extension from the sexual organs, in half of the rest from perityphlitis, while gallstones, tumors, etc., are responsible for the remainder. Morton, of Bristol, Eng., ⁶_{Apr. 14, '94} reports three cases of localized peritoneal abscesses containing gas, two of which were perityphlitic, the other being tubal in origin. Lecoq ⁵¹_{July, '94} points out that suppurative peritonitis in childhood due to the pneumococcus may be primary or secondary, general or localized. The diagnosis is often difficult, but the only treatment is laparotomy. Goriatschkine ⁹¹_{July 10, '94} agrees with Lecoq and reports two cases, one found post-mortem. Brown, of Montreal, ²⁸²_{July, '94} reports a case of tubercular peritonitis in a child 2½ years old, with miliary deposits in the lungs. Wilmaers, of Brussels, ⁴⁵⁴_{June, '94} describes a case of primary tubercular peritonitis in an adult, the only symptom calling attention to the peritoneum being ascites. The diagnosis was confirmed by the autopsy.

Treatment.—Richardière ³¹_{Dec. 20, '93} states that the prognosis and treatment of tubercular peritonitis is determined by the age of the patient, the condition of the other organs, and the special form of the peritonitis. The prognosis is favorable in children from 5 to 15 years of age; it is grave if the other organs are affected, except the pleuræ, and if it is the ulcerating form. The ascites of tuberculosis is in itself harmless, and the tubercular peritonitis which takes the ascitic form usually tends to recovery, as it forms adhesions and false membranes which may be absorbed. If absorption does not take place, the danger is either from intestinal obstruction or atrophy. When there is serous effusion, removal of the fluid by puncture is advised. In the ulcerating form not much can be hoped for; but incision and irrigation may be practiced. Jaboulay, of Lyons, ³¹_{Nov. 11, '93} enumerates, as indications for surgical interference in tubercular peritonitis, the presence of ascites, the formation of an abscess, or the occurrence of intestinal obstruction. In ulcerating, caseous peritonitis laparotomy is of no avail.

Vierordt ³²⁶_{B. 52, II. 3} states that in female children tubercular may be distinguished from non-tubercular peritonitis by the occurrence

of a tubercular discharge from the vagina. He urges timely operation by incision. McNutt, of San Francisco, ⁷⁷_{July, '94} read before the American Medical Association accounts of four cases of tubercular peritonitis where recovery followed laparotomy. There was effusion in each case and the peritoneum was covered with nodules. The author points out that the appearance of the abdomen in tubercular peritonitis resembles in contour that in cystic ovarian disease, and not that of simple ascites, probably because the peritoneum is thickened. For tubercular peritonitis with exudation W. Nolen ¹²⁶_{July 15, '94} aspirated and then injected warm, sterilized air. Mosetig-Moorhof conceived the same idea for treatment, and Duran ⁸⁰_{June, '94} also has practiced it.

Guignabert ²⁴_{Apr. 1, '94} describes the technique of naphthol-camphor injections in tubercular peritonitis, as urged by Rendu, ²_{Oct. 29, '93} who does not see any danger in them, disagreeing with Fernet, who was one of the first to try the treatment. In a discussion on the subject Manquat ¹⁴_{July 29, '94} claimed good results for other methods, which were without risk. Rendu, in reply, stated that the injections were without danger and, further, that they prevented relapses.

In discussing the treatment of the different forms of peritonitis in children le Gendre and Broca, of Paris, ¹⁰⁰_{Jan. 30, '94} recommend, in the acute form without effusion, rest and opium with rectal alimentation. Wherever there is purulent effusion they favor free incision and drainage. In tubercular peritonitis medical means should be thoroughly tried; but, these failing, surgical measures should be resorted to oftener than is at present done. They advise operation in the tubercular forms where there is ascites or only a dry, fibrous exudate without adhesions. When adhesions exist, operation should be made only for the relief of intense pain or of intestinal occlusion by bands. In ulcerative tubercular peritonitis, where the process is dry or where there are multiple ulcers, operation is of no avail. If, however, there is an encysted pocket of pus, a free incision should be made, with careful curetting. In all cases, before operation, a careful examination should be made of the other organs, to see that they are not too much affected by the tubercular process.

Lutaud ⁴³⁹_{Feb., '94}; ⁸⁰_{Apr. 16, '94} lays down the general principles for guidance in treating peritonitis, the main indications being to subdue pain,

to prevent extension of inflammation, and to control vomiting, tympanites, and other secondary symptoms. If seen when the process is local, leeches should be applied over the spot, followed by collodion over the whole abdomen, and then an ice-bag or hot turpentine stupes. Opium must be freely given.

Absolute rest is advised by Treves,²_{Feb., Mar., '94} with rectal feeding; as little opium should be given as possible; aperients may be used in some cases with discrimination, but are useless in the great majority of cases; blood-letting may justly be resorted to more frequently than is the custom at present; operative measures are usually successful in the suppurative form, especially when localized, but are generally of no avail when there is a general, diffuse, non-tuberculous peritonitis. Rogers, of Marysville, Cal.,¹⁴⁷_{Nov., '93} adheres to the opium treatment of peritonitis, as described by Alonzo Clark. He thinks that it gives better results than any other mode of treatment, and is invaluable for country practitioners, who cannot always resort to surgery.

MISCELLANEOUS INTESTINAL DISORDERS.

L. Cantu⁵⁰_{Aug. 16, '94} studied the effect of temperature on intestinal fermentation, using the ethers in the urine as an indication of the extent of the process. Individual predisposition was found to exert a decided influence. A draught of air over the abdomen of a sleeper often increased fermentation, although some individuals were unaffected. Local chilling with ice always produced increase of fermentation.

G. Singer⁵⁷_{Dec. 24, '93} points out the causal connection between intestinal fermentation and several skin diseases,—acute and chronic urticaria, acne vulgaris, and pruritus senilis. Herter,¹_{Jan. 27, '94} of New York, in discussing excessive intestinal putrefaction, stated that it occurs in many conditions, especially epilepsy, chronic nephritis, anæmia, melancholia, etc. The amount of ethereal sulphates in the urine is an indication of the extent of fermentation. Drugs are of little avail, a diet of rare beef and milk relieving the condition most rapidly.

A. Lesage and J. Dauriac¹⁰⁰_{Oct. 17, '93} refer to Cantani's method of washing the intestines as incomplete, because not enough liquid is used. They advise that the patient be placed horizontally, with the left hip slightly raised, and that a soft catheter be introduced

as far as the middle of the transverse colon. Warm water can then be introduced from a reservoir elevated from twenty to thirty centimetres above the patient. When 3 litres (quarts) have been injected and colicky pains follow, the water is entering the small intestine. If, now, the level in the reservoir cease to fall, the reservoir may be elevated. In a short time dullness of Traube's semilunar space will show that the stomach is filled, when the water will shortly begin to flow out of the mouth. The quantity to be used varies with the age of the patient,—for the newborn, 1 litre (quart); for a child, 2 litres; for an adult, 8 litres. The authors have used this method in cholera, enteritis, and icterus, and suggest it also in uræmia, intestinal occlusion, intestinal auto-intoxication, etc. Greslow claims priority in showing the feasibility of this procedure. A. de Genersich⁷³_{No.39,'93} recommends it and proposes the term “diaclysm.”

Pilliet¹⁶⁴_{Oct.26,'93} points out that localized tuberculosis of the cæcum may often simulate a malignant tumor and may lead to operation. Removal of the affected portion of the intestine has been successfully done. Lava⁹⁹⁷_{Nov.23,30,'93} relates a case of primary tubercular ulcer of the pylorus ending fatally by perforation. Tubercular ulcerations of the colon are reported by Barnhart, of East Toronto,³⁹_{Jan., '94} and Moore, of London.²_{May 5, '94} Griffith, of Philadelphia,²³_{May, '94} in a clinical lecture, showed a case of tubercular enterocolitis in a boy of 4 years. Coleman²_{Sept.30,'93} gives the post-mortem results of sixty cases of tuberculosis in children. The parietal peritoneum was the seat of deposits in 15 per cent., the visceral in 12 per cent. Tuberculous intestinal ulcers were found in 52 per cent. Mesenteric glands were affected in 66 per cent. Wyss,²¹⁴_{Nov.15,'93} in 123 autopsies in children, found, in 3 cases dying from other causes, primary tubercular deposits in the intestine.

Collin,⁹⁹⁶_{June 10, '94} in a study of simple duodenal ulcer, reports fifty-nine cases. The ulcer is usually near the pylorus and is round and single. Perforation—the most common complication—occurs twice as often on the anterior as on the posterior surface. Histologically it is an atonic ulcer without marked inflammatory changes in the surrounding tissues. Adult age and male sex are predisposing conditions. Although it is supposed, like gastric ulcer, to be associated with hyperacidity, some cases have not had an excess of acid. The difficulty of diagnosis is evident, but the author states

that there is great probability of duodenal ulcer when a patient, apparently in good health, has melæna or hæmatemesis, with pain just under the liver, to the right of the median line, a few hours after eating, with no gastric disturbance and a prompt return of appetite after the hæmorrhage. Eighty-seven per cent. recover, scars being found post-mortem. Death may be the result of hæmorrhage, of anæmia, of perforative peritonitis, of marasmus, of gastric ulcer, or of intercurrent maladies, as phthisis. Marie⁷_{No. 11, '94} reports a case which was unsuspected, death resulting from perforation. He counsels that surgeons should always look at the duodenum, if the iliac fossa is clear, in purulent peritonitis.

Hamburger⁵⁸³_{Dec. 23, '93} found, in ascitic fluid in a dropsical patient, a micro-organism which he calls bacterium lymphagogen. It is a slightly-motile micrococcus, ærobic, average size from 0.5 to 0.8 micromillimetre. Cohnheim's view of dropsy is that it is due either to excessive venous hyperæmia or to increased permeability of the walls of the capillaries. Hamburger points to a third form,—stimulation of the capillary endothelium by the bacterial products.

Weiss, of Vienna,³¹⁹_{July 21, '94} states that chylous ascites may be due to (1) causes acting centrally on the thoracic duct, obstructing the onward progress of the chyle, as rupture from external violence, pressure from without by tumors, or obstruction from a calculus or congenital stenosis; (2) causes acting peripherally on the lacteals and small lymph-channels, pathological processes either obliterating them or rendering the walls of the vessels pervious to chyle. He reports a case characterized by emaciation and painless ascites. The fluid contained a few red blood-cells and many cells somewhat larger than leucocytes, containing highly-refracting globules like fat-drops. At the autopsy a deep-seated carcinoma of the stomach was found pressing on the receptaculum chyli. As regards the frequency, the author quotes Bargebuhl's collection from literature of forty-eight cases. This is probably unreliable, as Busey, in 1889, was able to collect reports of fifty-three cases, as pointed out by Verdelli,⁴¹_{June 4} whose case was a sarcoma of the mesentery, affecting also the posterior mediastinal glands, thus causing pressure. Verdelli classifies the condition in four groups: (1) a true outpouring of chyle; (2) fatty degeneration of inflammatory or neoplastic tissue in ascitic fluid; (3) the outpouring of

chyle due to the *filaria sanguinis*; (4) variation of the fluid from opalescent to true chyle.

Emminghaus, of Freiburg, ³⁴_{Jan., '94} reports two cases in which pathological changes were found in the greater splanchnics. One case, that of a woman of 56 years, melancholic, with obstinate constipation, died in a septic, pyæmic state. The myelin fibres were diminished in the right splanchnic, and there was an irregularity in the size and number of the bundles on the two sides. The second case was a male of 49 years, a paranoiac, who had a colliquative diarrhœa, simulating intestinal tuberculosis. The greater splanchnic on the right was surrounded by inflammatory exudate, and in two of its bundles the myelin was wanting. Lahnsen, of Munich, ³⁴_{Feb., '94} lays stress upon the presence, in nervous dyspepsia and other nervous intestinal affections, of tenderness on pressure over the solar plexus. H. Stein, of Vienna, ¹⁶⁹_{Aug., '94} urges the use of the term "enteralgia" to describe intestinal colic depending on functional disturbance or neurosis, where only the nerves are affected. He includes under this term nervous diarrhœa, or enteritis membranacea, and colic resulting from a toxæmia, as from lead, malaria, or gout. Pain is usually felt in the umbilical region and the abdominal wall is retracted. Treatment is often difficult. Drastic purges should be avoided. The bowels should be quieted by opium (if necessary), belladonna, hyoscyamus, or cannabis Indica; enemata or calomel may be used, and a general tonic treatment be instituted.

F. J. Bose, of Montpellier, ⁹²_{Aug., '94} reports two interesting cases of an infectious malady of intestinal origin, characterized by a general, desquamative, polymorphous erythema, with fever, obstinate constipation, proceeding in regular steps, and caused by a micro-organism similar to the colon bacillus. One case began with a prostatic abscess, which opened into the rectum, and after an illness of four months the patient succumbed in the typhoid state. The fever was irregular, the eruption varied, sometimes resembling measles, sometimes scarlet fever, being followed always by a bran-like desquamation everywhere except on the hands and feet, where it was scaly. Constipation was obstinate, especially at the exacerbations. The bacillus was found in the stools, but not in the blood. Injections into animals produced septicæmia; when the toxin alone was injected it produced fever and erythema.

Simon, of Baltimore, ⁵⁹_{Mar. 17, '94} reports a case of acute gastro-enteritis induced by a large dose of mustard taken with the purpose of inducing abortion. For several days the urine was scanty, containing albumin and large amounts of uric acid and indican.

Delafield ⁵⁹_{Mar. 17, '94} calls attention to the slight degree of change occurring in the intestines in enterocolitis, even in fatal cases in children.

A. A. Young, of Newark, N. Y., ¹¹⁵⁴_{Mar., '94} describes some cases of what he terms "sporadic intestinal catarrh." The disease was ushered in by a chill and high fever, pain in the head and down the spine, tenderness in the epigastrium, enlargement of the liver, coated tongue, hæmorrhages from the upper respiratory mucous membranes, nervous prostration, irregular heart-action, scanty and high-colored urine, constipation or diarrhœa, and in the stools little berry-like bodies which, microscopically, were found to be aggregations of spores. Carbohydrates tended to increase these, while nitrogenous food diminished them. Intestinal antiseptics were successfully used in the treatment.

Edelheit ³¹⁹_{June 30, '94} observed a case of obstinate diarrhœa in a patient with the uric-acid diathesis, whose stools were finally found to give the reaction for uric acid. Fischl, ⁵⁰_{Aug. 11, '94} in investigating what he terms "gastro-intestinal sepsis," found that in over half of the cases of death reported as due to septicæmia, atrophy, debility, etc., the staphylococcus pyogenes albus was present.

Bowen ⁴⁵¹_{Dec., '93} describes, under the name of *psilosis pigmentosa*, a well-defined condition seen in the Barbadoes, consisting of a chronic diarrhœa, the pathological changes associated with it being an inflammation of the mouth and alimentary tract, with a stripping off of the epithelium, a pigmentation of the dorsal aspects of the hands and feet, annular ulcers in the ileum producing puckering, and punctiform ulcers in the large intestine. In some cases the disease shows intermissions and improvement, but usually progresses to a fatal end in spite of treatment. It seems distinct from tuberculosis, and syphilis has been excluded in some cases, although in many others there was a specific history. Brunton ¹³¹_{Mar., '94} recommends massage as useful, and quotes Sir Joseph Fayrer to the effect that exclusive milk diet is the only form of treatment likely to cure.

Maragliano, of Genoa, ⁴_{Mar. 26, '94} in an interesting paper, gives the

clinical history of three cases of purulent peritonitis occurring in strong men following an attack of indigestion. Tenderness was general, but more marked in the right iliac fossa; faecal vomiting occurred and all died,—one in spite of laparotomy. The gross pathological changes consisted in ulcers in the lower part of the ileum in different stages of development, one in each case having perforated. In one case there were ulcers on the serous aspect of the gut not perforating the mucosa; the blood-vessels were injected and minute hæmorrhages could be detected by holding the gut up to the light. The ulcers resembled the so-called peptic ulcers. Microscopically the blood-vessels of the mucosa, submucosa, and subserosa were seen to be dilated. Hæmorrhages had occurred and an extensive round-celled infiltration was present, obscuring or destroying the glandular crypts. Bacteriological investigations revealed the presence of cocci (not in chains) and of bacilli which were pathogenic to lower animals when injected into the peritoneum or intestine. Cultures of the injected bacteria could be obtained from the blood or peritoneal exudate. The writer terms the bacillus *B. brevis subtilis*, and considers it to be a form of the protean colon bacillus, and, although the evidence is not conclusive, to be responsible for the pathological condition. He divides the process into three stages,—a prodromal catarrh, without fever, lasting even ten or twelve weeks; a period of enteritis lasting five or six days, with acute abdominal pain and usually constipation, tympany, and vomiting; the third period resembles that of ileus, with perforation and purulent peritonitis and faecal vomiting. The diagnosis is scarcely possible before the third period, when it is usually too late, but the only procedure then of avail is resection of the diseased ileum.

Rogers, of Fairfield, Ill., ⁸²_{Apr. 21, '94} reports two cases of ulcerative colitis cured by enemata of nitrate of silver, nitrate-of-silver capsules by mouth, and a low diet of oatmeal, milk, and whey. Anderson ⁸²_{June 23, '94} obtained the same result by means of Carlsbad salts, intestinal antiseptics, and bismuth. Bannatyne ³⁶_{Aug., '94} discusses the relationship between ulcerative colitis and granular disease of the kidney, and reports two cases,—one of ulcerative colitis complicated by granular kidney disease, the other of granular kidney disease toward the close of which intestinal hæmorrhages and ulceration appeared.

Mayor³_{No. 46, '93} has observed sigmoiditis, with symptoms analogous to typhilitis. Constipation seems to have some bearing on the etiology. Points to be considered in the differential diagnosis are: the cord in enteroptosis; iliac adenitis; gastro-colic dilatation and muco-membranous colitis.

Surmont and Brunelle, of Lille, ³⁶⁰_{Aug., '94} in exhaustive researches on the elimination of nitrogen by the kidneys in the course and convalescence of saturnine colic, conclude that during the colic (1) the volume of urine is diminished; (2) the total amounts of nitrogen and urea are diminished, to return to normal on recovery, sometimes gradually, sometimes suddenly; (3) uric acid is sometimes diminished, more often increased; (4) other nitrogenous substances, as hippuric acid and creatinin, vary; (5) the volume of the urine does not vary with the amount of nitrogen; (6) in some cases the amount of nitrogen is normal.

Péron, of Paris, ⁶_{May 19, '94} advises, for lead colic, 0.40 gramme (6 grains), daily, of monosulphite of sodium. It is said to be prophylactic, eliminant, and free from danger.

Wrafter²³⁹_{Feb. 1, '94} reports a case of profuse intestinal hæmorrhage of uncertain cause, in a woman over 60 years of age, in whom recovery ensued. Rekhrai, of Punjaub, thought the case was one of chronic congestion of the liver, the hæmorrhage being excited by a dietary indiscretion.

Rowley, of Kachrapara, India, ²³⁹_{Apr. 16, '94} reports a case which had been treated for gastric catarrh and dyspepsia for a long time. It was characterized by a gnawing pain coming on about midday, and lasting for several hours, occurring for four or five days and then intermitting for a time. After repeated thorough examinations, sand-like material was found by washing and straining the stools. In this sand crab-like parasites were seen microscopically, and the sand was supposed to be the *débris* of cocoons of the parasites. Intestinal antiseptics were of no avail and all other medicinal treatment failed. The patient returned to England, the sea-voyage apparently entirely relieving the condition.

Wolisch⁵⁷_{Mar. 25, '94} gives the history of a case simulating appendicitis in some respects, but which proved to be retro-cæcal actinomycosis.

Berry²_{Feb. 10, '94} describes a case of dilatation and rupture of the sigmoid flexure in a man of 73 years. The cause rested between atony and volvulus. J. A. H. White, of Newcastle, Eng., ²_{May 19, '94}

reports a case of traumatic rupture of the jejunum without external injury, the patient having been caught between a broad surface behind and a pointed edge in front.

Egan ⁹⁹_{June 14, '94} reports a case of gunshot wound of the abdomen, followed by faecal fistula which healed without operation. Martin reports ²⁴³_{Feb., '94} a case of bayonet wound of the abdomen, the bayonet entering below the umbilicus on the left and protruding in the left lumbar region. Slight tympanites followed, obscuring the liver-dullness and making the existence of a perforation probable. Recovery was complete without operation.

Glénard ³¹_{Aug. 25, '94} emphasizes the value of abdominal palpation, and claims that the sigmoid flexure can be palpated. Three pathological conditions may exist which palpation may reveal: stenosis, inflammation, and dilatation; stenosis by the presence of a cord about the size and consistency of the tendon of the semitendinosus in the popliteal space; inflammation by a tender, cylindrical tumor in the left iliac fossa (Lauder Brunton's morning-diarrhœa being associated); dilatation is also associated with gastrectasis and the limits of the flexure cannot be defined. The last condition is really what Glénard has described as enteroptosis.

Genersich ⁵⁶⁶_{Dec., '93} reports a case of congenital dilatation and hypertrophy of the colon ending fatally. Cases of dilated colon are reported by Churton, of Leeds, ²_{Jan. 13, '94} Stanley, ²_{Apr. 28, '94} and Oestreich. ⁴_{Aug. 23, '93}

Among the foreign bodies reported to have traversed the alimentary tract without injury to the host are the following: a nail (Hendricks, of Burlington, Ia. ¹³⁹_{May, '94}); a phial two and one-half inches long and half an inch thick (Benjamin, of Ahmedabad ²³⁹_{Nov. 16, '93}); the clapper of a bell two and one-half inches long, a silver half-dollar (Condee, of Williams, Ind. ¹⁰²_{Nov., '93}); a shawl-pin two and five-eighths inches long (D. J. M. Miller, Philadelphia ⁵¹_{Jan., '94}); a pin (Wunderlich, of Küssnacht ²¹⁴_{Dec. 1, '94}); a ball three centimetres long and eight millimetres wide, a French son, and a marble weighing 5 grammes— $1\frac{1}{4}$ drachms (Revilliod ¹⁹⁷_{Jan. 29, '94}); a penknife three inches long (Goodall, of Greenwich, Eng. ⁶_{Aug. 18, '94}); ninety-three cherry-stones, removed from the rectum of a child at one time (Armogan ¹⁸⁸_{July 8, '94}); a five-franc piece (Cerné ²⁰³_{June, '94}).

ANIMAL PARASITES AND THEIR EFFECTS.

By CHARLES S. DOLLEY, M.D.,

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General.—The announcement of a revised edition of Leuckart's work ²¹⁰⁷_{'94} will be welcomed by physicians and helminthologists alike. The monographs on *Bilharzia* and *Hirudinea* show how painstaking has been the revision of this standard work. Heisig ⁵⁴⁰_{Mar. 2, '94} presents statistics of the human entozoa obtained in the examination of two hundred and thirty living persons. These show absence of parasites in children below 1 year and a steady increase in those of 1 to 15 years of age. Sousino ⁵⁰_{Aug. 15, '94} reports *Ascaris*, *Trichocephalus*, *Oxyuris*, *Tenia saginata*, and *Bilharzia* as of very frequent occurrence in Egypt and Tunis. F. Herff, of San Antonio, ¹⁴³_{June, '94} describes the entozoa encountered during forty years' practice in Texas.

Edwin Dobson ²⁰⁶_{Dec., '92, Jan., Feb., Mar., Aug., '93}; ²_{Oct. 7, '93} makes an important contribution to our knowledge of Indian helminthology. In the stools of 1249 natives of India, to whom 30-grain (2 grammes) doses of thymol were administered,

Dochmius duodenalis was found in 944 instances,—75.58 per cent.					
Ascaris lumbricoides	"	"	131	"	10.49
Oxyuris vermicularis	"	"	192	"	15.36
Distoma	"	"	13	"	1.04
Trichocephalus dispar	"	"	55	"	4.40
Larvæ of insects	were	"	6	"	0.48
Tape-worm	was	"	18	"	1.44
No parasites	were	"	204	"	16.32

An important fact to be noted is the extreme frequency of intestinal distomata in India.

Thomas L. Bancroft, of Brisbane, ²⁶⁷_{Aug. 15, '93} reports for the first time the occurrence of *Stephanurus dentatus* in the pigs of Queensland. He refers to it as common in pigs on the Johnstone River. *Dochmius duodenalis* is stated to be widely distributed in Queensland, as is *Trichocephalus dispar*. Max Braum ⁷⁰¹_{No. 428, '94} and C. W. Stiles ⁵⁰_{Apr. 7, '94} urge upon helminthologists the great necessity

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of placing typical specimens in the great museums, where they may be available for future comparison.

PROTOZOAN PARASITES—SPOROZOA ; RHIZOPODA ; INFUSORIA.

Sporozoa. — The question of parasitism in cancer received considerable attention at the Eleventh International Congress. ¹⁴
The discussion was opened by Pio Foà, of Turin, who pointed out that, notwithstanding the demonstration that bacteria play no rôle in the etiology of carcinoma, many pathologists continue to believe in the parasitic nature of cancerous affections. He referred to the proof that cancer is transmissible to animals of the same species by auto-inoculation, accidental inoculation by the surgeon's knife, and experimental inoculation practiced on man and animals, and also noted the proof, by clinical observation, of the transmission of cancer by contact, and the statement that cancer is practically endemic in certain countries, causing about 15 per cent. of the mortality. The biochemical relations of the disease,—the production of toxin,—the excessive consumption of nitrogenous substances, and the resulting marasmus were considered. Thoma was mentioned as the first to assert the parasitic nature of the disease. Albarran, Darier, and Malassez described in epithelial and medullary cancers, as well as in Paget's disease, certain histological elements resembling psorosperms. Steinhaus and others described bodies having the appearance of parasites in the nucleus and in the protoplasm of the cancerous cells. Russell found in cancerous tumors bodies which stained strongly with acid fuchsin, and which he took to be blastomycetes; since then he has demonstrated the same bodies in non-cancerous tissues of different animals, and they are to-day considered as analogous to the granules of Altmann, with no relation to the etiology of cancer. Podwyssotzki and Sawtchenko found in cancerous tumors falciform bodies,—sometimes intercellular, sometimes within the cells, and resembling the spores of protozoans. Strøbe described similar bodies. In 1891 Pio Foà, Soudakévitch, Ruffer, and Walker described bodies in cancerous neoplasms. Pfeiffer, Adamkiewicz, and Korotnef are classed together as considering these elements parasitic which, by all other pathologists, are regarded as the epithelial and connective-tissue cells of the neoplasm. Many authors, as Hanseemann, Ribbert, Cornil, Unna,

Hlava, and others are opposed to the parasitic theory and of the opinion that the pretended cancerous parasites are nothing else than the products of degeneration, cellular inclusions, blood-corpuscles, or chromatic filaments, the result of a breaking up of the nuclei or nucleoli.

Cornil, of Paris, entered the discussion by describing the karyokinetic figures found in epithelial tumors, and asserted that the bodies regarded as parasites by Foà, Soudakévitch, Ruffer, Podwysotszki, and others correspond exactly with those bodies which he described in 1891 in his work on "The Indirect Division of Cancerous Cells." S. Duplay and Cazin, of Paris, stated that their researches accorded entirely with those of Cornil. A. Ruffer, of London, on the other hand, said that his researches, in conjunction with those of Walker and Plimmer, led to the same conclusion as that of Foà, but he subscribed to the conclusions of Duplay and Cazin, that the coccidia of Wickham, Korotnef, Podwysotszki, Sawtchenko, and others are nothing but invaginated and degenerated pathological cells. The discussion then passed to the transmissibility of cancer.

Duplay and Cazin called attention to the one hundred and twenty experiments with grafts and inoculations of neoplastic tissues, principally in dogs and rats. In every case the results were negative as regarded malignant new growths. Trasbot, of Alfort, pointed to the fact that dogs are particularly disposed to cancer, and that this is especially true when they are fed largely on a highly-nitrogenous diet. Boinet, of Marseilles, referred to the cultures made with the blood of cancerous persons and with the juice of tumors as containing many non-pathogenic microorganisms. The treatment of these juices with alkalis suffice to extract a substance exhibiting the chemical characters of ptomaines and toxalbumins. When injected this product gives rise to trembling, syncope, and death.

I. Adler, of New York, ⁵_{Jan., '94} sketches the present status of the relation of protozoa to carcinoma on the basis of the publications of others and his own examination of several thousand sections from over sixty specimens. His paper is accompanied by a bibliography of eighty-four references, and his conclusions are summed up as follows: "The existence of parasitic protozoa in cancer is probable, though the greater part of what has hitherto been

described as parasitic is certainly not so. No constant or in any way specific organism has as yet been demonstrated beyond possibilities of doubt. At present no facts, histological or otherwise, compel the assumption of a parasitic origin of carcinoma, while there are very strong and valid arguments against such assumption. For many years to come the indefatigable efforts of numerous investigators will be required to throw light on this most obscure of diseases. A more intimate penetration into the mysteries of cell-structure and cell-life, both in health and in disease; a closer study of the living tumor-tissues; an endeavor to clear up the, as yet, entirely obscure chemistry of neoplasms,—on these lines, no doubt, advances in our knowledge will be made. Nor should the further study of protozoa be neglected; but it should always be allied with coolest criticism, and never leave the *terra firma* of experiment and fact for the airy region of wild theorizing and speculation.”

Max Kahane, of Vienna, ⁵⁰_{Mar. 24, '94} claims to have found living parasites in the blood of tumor-cells of carcinomatous patients. The portions of tissue when taken from the body were immediately placed in sterilized, normal salt solution and microscopical investigation made at once. As the result of this he found, in the blood of the tissue-particles, little bodies with exceedingly lively, independent motion, which could only be explained as due to the possession of special motile organs,—flagellæ and cilia. These little ciliated bodies were amœbiform, irregular, glistening, and unusually refractive. At times they rotated with the greatest rapidity; at other times they showed a direct sailing motion. They circulated freely in the blood or swam around the red blood-corpuscles, and were found to penetrate the blood-corpuscles and to give rise to a granular appearance not to be distinguished from the results of cellular necrobiosis. Kahane insists, therefore, that only by the examination of living blood can the presence of parasites be diagnosed. By the use of a sodium-chloride solution of methyl-blue (Rosin's formula) he was enabled to stain the organisms, to determine their plasmodial nature, and to demonstrate spore-like inclosures. Morphologically and biologically these parasites resemble those found in intermittent fever.

Gratia and Leinaux, of Paris, ¹⁹_{Jan. 19, '95} report negative results in their attempts to transmit cancer from dog to dog, or man to dog.

C. W. Stiles²¹⁰⁸_{Nov., '94} reports several undetermined species of sarcosporidea,—one from the muscle-cells of cattle, one from wild rabbits, another from the American redstart, and a very delicate form from the muscles of chickens.

Guelliot, of Rheims,²_{Oct. 20, '94} reports the result of an inquiry as to the contagiousness of carcinoma. In the author's opinion his facts show: 1. That cancerous affections are unequally distributed in adjoining districts, and that neither heredity nor consanguinity is adequate to account for this. 2. That there are real cancer-houses, the dwellers in which, though having no link of blood-relationship between them, are successively or simultaneously attacked by malignant tumors. 3. That cases of cancer attacking two persons living together are relatively frequent. Of one hundred such cases, published and unpublished, in eighty-five the persons attacked were man and wife; in eight they were medical practitioners who had been specially engaged in the treatment of cases of malignant disease. According to the author these facts tend to show that cancer is transmitted directly or indirectly, and that it runs its course as an infectious disease, with an average incubation of from a few months to two years, a primary lesion, then generalization.

Delore, of Lyons, stated, in the discussion of this paper, that cancer seemed to him capable of being transmitted by pregnancy. Fifteen years ago, at the Congress of Blois, he had brought forward a case in point.

O. P. Ohlmacher⁶¹_{Nov. 5, '93; June 30, '94}¹ criticizes the sporozoan theory of malignant neoplasms from a microtechnical stand-point. He directs attention to the importance of a rigid analysis of all the so-called "artifacts" resulting from a mixture of the numerous reagents employed in microtomic technology, and concludes by a record of the results obtained by the use of those reagents which have found especial favor among the carcinoma-investigators when employed in the study of the myxosporidian parasite of the kidneys of toads.

Walther Petersen, of Zurich,⁵⁰_{Oct. 16, '93} after a careful study of the so-called psorosperms of Darier's disease, concludes that the "*corps ronds*" and "*grains*" are not psorosperms, but degeneration products of the epidermal cells.

O. P. Ohlmacher⁶¹_{May 20, '93; June 30, '94} and J. B. Whinery¹_{Dec. 2, '93} describe a

myxosporidian parasite which appears to be common in the toad (*Bufo lentiginosus*, Shaw). The importance of everything relating to the biology of the sporozoa is clear, in connection with the present discussions concerning the relation of sporozoa to carcinoma and other neoplasms in man. The parasite in question has been named by R. R. Gurley, of Washington, *Chloromyxum Ohlmacheri*. Laurent⁵⁷⁷_{Jan., '94} gives a succinct and systematic presentation of the various hæmatozoa. The recent researches in the hæmatozoa of birds by Sakharoff²⁶²_{Dec. 9, '93}; ²_{Mar. 24, '94} lead to the conclusion that the escape of filaments from parasites is very probably due to some fault in karyokinesis, caused by changes of temperature or other chemico-physiological conditions; in other words, that flagellate forms do not exist normally in the blood. This view is concurred in by A. Labbé.⁹²⁷_{Dec. 9, '93}; ¹²⁶_{Apr. 15, '94}

Amœba.—A. Celli and R. Fiocca, of Rome,⁵⁰_{Apr. 7, Sept. 6, '94} contribute a most interesting report of their studies of amœbæ with direct reference to their pathological relations. After experimentation with a great variety of culture-media they at last succeeded in finding one in which they were enabled to obtain cultures through a period of two years. The species given as infesting the intestinal canal of man and animals, including three new species, are: *Amœba lobosa*, var. *guttula* (syn. *A. guttula*, Duj.); *A. lobosa*, var. *oblonga* (syn. *A. oblonga*, Schma.); *A. lobosa*, var. *coli* (syn. *A. coli*, Loesch); *A. spinosa*, Celli and Fiocca; *A. diaphana*, Celli and Fiocca; *A. reticularis*, Celli and Fiocca; *A. vermicularis*, Weisse. Lingi Capitanio¹⁰⁹⁵_{Feb., '94} gives an exhaustive and critical review of the amœba in respect to pathology, with special reference to malaria and Texas fever.

Cytorictis vacciniæ, Guarnieri (1894).—At the Eleventh International Medical Congress Guarnieri¹⁹_{Dec. 1, '94} described, under the name of *Cytorictis vacciniæ*, a micro-organism showing amœboid movements found in the forming-pustules of variola, of which he believes it to be the cause.

Trichomonas vaginalis, Donné.—F. Marchand, of Marburg⁵⁰_{May 19, '94}; K. Miura, of Tokio⁵⁰_{July 9, '94}; and George Dock, of Ann Arbor, Michigan,⁹_{Dec. 22, '94} all report cases of the occurrence of *Trichomonas vaginalis*, Donné, in the freshly-passed urine of male patients.

Megastoma intestinalis, R. Blanchard (1885).—A. Epstein,

of Prague, ⁸⁸_{No.35,'93} records twenty-six cases of infusorial diarrhoea in children, due to the presence of *Megastoma intestinalis*, R. Blanchard. F. Moritz and Hans Hölzl, of Munich, ³⁴_{V.39,No.47,'92}; ¹³_{Jan.10,'94} in a study of the frequency and significance of the above parasite in the intestine of man, find that it occurs in 20 per cent. of all children, 40 per cent. of adults, and in 54.5 per cent. of tuberculous patients. The number of the megastoma is sometimes immense, reckoned in one case as eighteen milliards. The effect of this parasite on the system seems to be apparently slight, and parasitocides are without effect.

Vorticella ascoideum, Lindner (1894).—G. Lindner, of Cassel, ⁴¹_{July 2,'94} supplements his former contributions on the subject by a discussion of the stalkless vorticellæ (*Vorticella ascoideum*), the encapsulated form of which is frequently found on the hair of various animals—dogs, horses, swine—and in man, producing pruritus or eczema; and in erosions of the skin, passing into lymph-vessels.

TREMATODE PARASITES—DISTOMA; GYNÆCOPHORUS.

Distoma Westermanni, Kerbert (1878).—A discovery of considerable interest, both to helminthologists and physicians, is that of H. B. Ward, of Nebraska, ⁵⁰_{Mar.16,'94} who records for the first time the occurrence of the fluke *Distoma (Mesogonimus) Westermanni* in the United States. “This parasite was found in a Japanese by Bälz in 1878, who, however, did not recognize its true nature; believing that the eggs which he found in the sputa were protozoa, he named (1880) the structures *Gregarina pulmonalis s. fusca*. Manson also found the eggs of this species in Amoy, and afterward obtained a specimen of the worm which Ringer had found in Formosa. Cobbold then obtained this specimen and described it as *D. Ringeri*. The parasite was afterward studied by several authors, notably by Leuckart, who discovered, to his astonishment, that the form was identical with one which Kerbert had found in the lungs of a tiger (*Felis tigris*) in Amsterdam.” This fluke, which Ward finds in the domestic cat, is more or less common in the small bronchi of man in Eastern Asia. “Individuals infested with these parasites show certain symptoms which may be summarized as follows: cough, light or absent; sputa of a rusty or slightly-yellowish color, owing to the presence of the brown eggs; occasionally hæmorrhages, which continue irregularly during several

years. The affection known as parasitic hæmoptysis, or simply as pulmonary distomatosis, seems to be quite common, 15 per cent. of the population being affected with it (certain regions of Japan). It does not appear to be incurable, and seems to be serious only in exceptional cases." The foregoing citations are from the article by Stiles,⁷⁶⁴_{May,'94} which is accompanied by illustrations and a full bibliography.

Braun, of Königsberg,⁵⁰_{Sept.22,Oct.20,Dec.18,'93}; ²¹⁰⁹_{Mar.,'94} contributes a careful *résumé* of the liver-flukes of the domestic cat (*Felis catus domesticus*) and related species.

Distomum sibiricum, Winogradoff (1892).—The same author (Braun) calls attention⁵⁰_{Apr.27,'94} to Winogradoff's description²¹¹⁰_{B.4,'92; Abt.2,Nos.9,13} of a fluke which is one of the most common parasites of the human liver in the region of Tomsk (Russia), being found in 6.45 per cent. of all autopsies. The parasite proves to be a new species, and is named *Distomum sibiricum*.

Distoma (Dicrocoelium) complexum, S. and H. (1894).—The list of liver-flukes found in cats and allied animals, given by Braun, is supplemented by Stiles and Hassall²¹⁰⁸_{June,'94} with the description of a new species—*Distoma (Dicrocoelium) complexum*—found in the liver of a cat in Baltimore. The paper is accompanied by illustrations and revised descriptions of the species *D. truncatum*, *D. albidum*, *D. complexum*, *D. felineum*, *D. viverrini*, *D. tennicolle*, and *D. conjunctum*, together with the literature of the species. Stiles and Hassall further announce the discovery of a new species of intestinal fluke (*Distoma tricolor*) in the cotton-tail rabbit (*Lepus sylvaticus*, Bachman) and in the northern hare (*L. Americanus*, Erseleben).

Gynæcophorus (Bilharzia).—Sonsino⁵⁰_{Aug.15,'94} reports Bilharzia as very abundant in Gabes and Tunis, frequently accompanying phosphaturia, which he refers to the hard water of the region. Delorme and Caillet report¹⁴_{Apr.22,'94} a case of Bilharzia. Looss, of Leipzig,⁶_{July 28,'94} has recently spent several months in Alexandria and Cairo with the sole object of studying the development of *G. hæmatobius*. His experiments with the molluscs, crustacea, and insect-larvæ of the Nile delta throw doubt upon the assertion that they act as intermediate hosts for the parasites, and the same holds true of water-plants. In the light of these studies Looss⁵⁰_{Aug.25,Sept.16,'94} reviews the article by G. Sandison Brock on the *Bilharzia*

*hæmutobiu.*²⁴⁷
v.2,'93 The points emphasized which are of especial interest to the practitioner refer to the necessity of patients suffering from hæmaturia not allowing their urine to gain access to bodies of water from which supplies are taken for drinking purposes, and of care to avoid drinking water from open ditches or canals.

CESTODE PARASITES—TÆNIA; BOTHRIOCEPHALUS; CYSTICERCUS;
ECHINOCOCCUS; CÆNURUS.

General.—New species of tape-worms are described by Cholodkowsky⁵⁰
Apr.17,'94 and Lönnberg.⁵⁰
May 23,'94 The former procured specimens of the parasite from the intestines of cattle and swine. It is about three metres long and ten millimetres broad at the posterior end. Cholodkowsky names it *Tænia Brandti*, after Edward Brandt. The species described by Lönnberg was obtained from the soft-shelled turtle (*Trionys ferox*) of Florida, and is given the name *Tetrabotheium trionychium*.

Potain, in his clinical lectures,¹⁷
Aug.30, Sept.13,'94 calls attention to the tenacity of life exhibited by the eggs of tape-worms, pointing out the fact that they resist for considerable length of time the effects of the sun and weather when exposed on the ground.

Ralph Blanchard⁷³
July 7,'94 supplements the descriptions of cestode monstrosities given in his "Traité de Zoologie médicale" by a summary of recent observations. Goltz⁸⁸¹
Jan., '94; Mar.16,'94 describes the presence of a black pigmentation of the rostellum and the absence of the crown-hooks in twenty-five specimens of *Cysticercus cellulosæ* from the muscles of an Hungarian hog. This is interesting in view of the proposition that such pigmentation is due to the taking of some iron salt as a medicine.

B. Küchel,⁵⁰
Mar.16,'94 in an inaugural dissertation, Kiel, 1893, describes a triple monstrosity of *T. saginata*. E. Perroncito⁷³⁹
Feb., '94; ⁵⁸⁹
Feb.17,'94 presents interesting data as to the rapidity of growth of *T. saginata*, indicating the possibility of over 13 *proglottids* a day,—i.e., 420 in thirty-two days.

Bückler, of Cologne,³⁴
Jan.9, Feb.13, May 16,'94 in his investigations regarding Charcot's crystals shows that these crystals are not by any means present in the feces in all cases of intestinal helminthiasis, but when present are accompanied by a relative increase in the eosinophile cells of the blood.

Tenia nana, Van Beneden (1861).—Chr. Rasch, ⁴¹_{Feb. 12}, ¹⁴_{May 6, '94} of Bangkok, records a case of *Tenia nana* in a 7-year-old girl of Siam. Adolph Lutz, of San Paulo, Brazil, ⁵⁰_{July 9, '94} contributes an interesting article on the occurrence of this parasite in Brazil. He records two cases,—one of a girl 2½ years old, the other of a girl 4 years old; from the latter over two thousand specimens were obtained. Lutz supports Grassi in considering *Tenia nana* to be identical with *Tenia (Hymenolepis) murina*, Dujardin, of rats and mice. If this identity is a fact, the rat may be looked upon as a source of infection. The only other case of *Tenia nana* recorded for South America is that of Wernicke, in Buenos Ayres, in 1890.

Tenia canina, Linné (1767).—John Thomson, of Edinburgh, ⁵¹_{May, '94} records a case of the occurrence of this parasite in a female child aged 14 months. On inquiry it was found that the parents of the child kept a white poodle and that the mother had on several occasions noticed the presence of similar worms in its motions.

Bothriocephalus latus, Bremser (1819).—A. Ekkert describes ⁸⁹_{No. 55, '93} ²¹_{Oct. 7, Dec. 23, '93} a case of progressive pernicious anæmia (Biermer's anæmia) due to the presence in the intestine of broad tape-worm. His observations lead him to concur in the hypothesis of Delio, Schapiro, Wiltshur, Reyher, Runcberg, and Botkin, that the pernicious anæmia arises from an intoxication with a poison excreted by the parasite. H. Lenhartz ¹³_{Apr., '94} describes a case of bothriocephalic anæmia in which he substantiates the above theory. In this connection Emanuel Kahn ²¹_{Dec. 2, '93} discussed the anomalies of menstruation due to the *Bothriocephalus latus*. Jesus Sánchez, ¹⁷⁹_{Jan. 15, '94} in a paper presented to the National Academy of Medicine of Mexico, refers to the frequency of tape-worms and cysticerci in Mexico as reported by Rinz. ²¹¹¹_{'91} He discusses at length the anomalies exhibited by this *T. solium*. *Bothriocephalus latus* is asserted to have no existence in Mexico, the only case on record being that of a French soldier. The absence of this species is attributed to the lack of fishes of the salmon family in Mexican waters.

Cysticercus.—M. Braum ⁵⁰_{Mar. 29, '94} discusses the occurrence in man of *Cysticercus tenuicollis*, Rudolphi, of the sheep, and *Cysticercus acanthotrias*, Vineland, of the dog and wolf. He concludes, as

regards *C. tenuicollis*, that the diagnosis in man has been a mistaken one, and that the finn described by Wyman was an abnormally large spherical *Cysticercus cellulosæ* with an unusually large number of hooks. As regards *Cysticercus acanthotrius*, he concludes that the species will not stand, and agrees with Redon, Blanchard, and Railliet, that in the cases cited we have to do with an interesting abnormality of *Cysticercus cellulosæ*.

Schwartz⁸⁸¹_{II.5.p.89,'93} shows, by careful examination of over one thousand specimens, that it is impossible to distinguish with certainty between *Cysticercus cellulosæ* and *C. tenuicollis* by means of the number of hooks.

Echinococcus.—Baccelli³⁹⁹_{No.15,'94} treats echinococceous cysts by injection of a solution of sublimate. If the parasite is situated in the liver he punctures with a well-sterilized trocar, of a diameter of two and one-half millimetres, the cyst at its highest points and withdraws a moderate quantity of the fluid, following this with an injection of about 20 grammes (5 fluidrachms) of a 1-per-cent. solution of sublimate. The tube is withdrawn and an antiseptic bandage applied. In five days the dressing is removed. The parasite is then destroyed and the subjective and objective symptoms gradually retrogress.

Martin Müller²⁰⁸²_{'93} presents an interesting study of the occurrence of echinococceous cysts and points to the fact that they may be frequently traced directly to infection from pet dogs and hunting-dogs. Hans Bahr²¹¹²_{'93}⁵⁰_{Mar.16,'94} emphasizes the danger of too close intimacy with dogs, in his carefully-compiled statistics of the occurrence of echinococcus in Pomerania, which shares with Mecklenburg the honor of being the classical land of echinococcus in Germany.

Two authentic cases of the occurrence of echinococcus in a cat are placed on record by G. Neumann, of Alfort.²¹¹³_{Sept., '93}⁵⁰_{Mar.16,'94}

C. W. Stiles and Albert Hassall²¹⁰⁸_{June,'94} report the occurrence of echinococcus in the camel. "At present we have no idea of the extent of the echinococceous hydatid in this country. The following are the only instances of its presence in domesticated animals in the United States, recorded in the Laboratory of the Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.: Welsh, 3 cases of the hydatid in hogs in Maryland; Moore, 2 cases in hogs in Washington, D. C.; Stiles, 1 case in

cattle in Nebraska; Kilbourne, 1 case of the adult in dogs in Washington. Wheeler condemned the livers of 117 out of 2000 hogs between July 15 and September 15, 1891, in New Orleans; Osler found it in 2.9 per cent. of the 1037 hogs he examined in Montreal. A number of cases have been recorded in man. To these cases may now be added a case in a camel."

Ferdinand Schmidt<sup>2082 50
93; Mar. 2, '94</sup> makes a study of the occurrence of echinococcus in the female pelvic organs. His conclusions are as follow: "1. If in the pelvic cavity be found one or more smooth, tense, elastic tumors which are not prominent and not painful when pressed, near which the separate ovaries may be made out, and if these tumors slowly and gradually develop without fever and characteristic pain and, notwithstanding their relative size, have not led to cachexia, an echinococcus may be diagnosed. 2. Probably a tumor is an echinococcus if it lie between the uterus and rectum and the sexual functions are disturbed but little or not at all; if similar tumors are found in other organs where determinable echinococci are abundant; if the patient have previously suffered from echinococcus, and if there have been an intimate association with dogs. 3. The inference is a certainty if one succeed in finding a well-defined hydatid tremor. 4. A positive diagnosis can only be arrived at by means of the fluid, obtained by spontaneous eruption or by puncture, which will exhibit the characteristic ingredients."

Cœnurus serialis.—L. R. Southerland, of Glasgow,<sup>213
July, '94</sup> records the finding of a specimen of this finn, the cause of "bladdery rabbits" in gamekeepers' parlance, in the loin of a female rabbit.

Treatment of Tape-Worm.—F. M. Schmidt, of Svecaborg,<sup>586 26
No. 3, '94; Apr.</sup> warmly recommends giving an extensive trial to a very simple and convenient method of treatment of helminthiasis (more especially cases of tape-worm) consisting in the internal use of black oxide of copper for from six to twelve days. Schmidt himself has been induced to try the plan through the perusal of Hermann Hager's work,<sup>2114
v. 9, 10, p. 455</sup> in which the oxide is eulogized as a "sure means of expelling tape-worms" and is said to "improve the patient's appetite and digestion" in addition. The following formulæ may be employed:—

1. *Pilulæ Cupri Oxydati*, Hager (Hager's pills against tape-

worm).—℞ Cupri oxydati nigri, 6.0 grammes ($1\frac{1}{2}$ drachms); calcariae carbonicae, 2.0 grammes (31 grains); boli albæ lævigatæ, 12.0 grammes ($3\frac{1}{4}$ drachms); glycerinae, 10.0 grammes ($2\frac{1}{2}$ fluidrachms). M. ft. pilulæ 120. D. S.: Two pills four times daily during the first week; three pills four times daily during the next week; to an adult. A child should be given two pills twice a day, and the total quantity of the pills must not surpass fifty or sixty.

2. *Placentæ Tenifuga*, Hager (Hager's tablets against tape-worms).—℞ Cupri oxydati nigri, 5.0 grammes ($1\frac{1}{4}$ drachms); calcariae carbonicae, magnesia carbonicae, āā 1.0 gramme ($15\frac{1}{2}$ grains); tragacanthæ 10.0 grammes ($2\frac{1}{2}$ drachms); glycerinae, 5.0 grammes ($1\frac{1}{4}$ fluidrachms); sacchari albi, 40.0 grammes ($1\frac{1}{4}$ ounces); aquæ, 3.0, vel 9 sat. M. ft. trochisi 50. D. S.: One tablet three times a day for children aged from 8 to 12 years. A child under 7 should be given half a tablet four times a day.

In either case the patient should avoid sour food and drink, and the copper course should be terminated by taking a table-spoonful of castor-oil. The parasites are said to be "discharged in a thoroughly disintegrated condition." Schmidt successfully resorted to the method in five cases (four of *Bothriocephalus latus* and one *Tenia solium*),—one of which referred to himself, one to a woman of 62 years, one to a middle-aged man, and two to children aged 9 and 10 years, respectively. Hager treats successfully, by the internal administration of the oxides, all cases of tape-worms in dogs. The following is one of his formulæ:—

Bacillula Tenifuga, Hager.—℞ Cupri oxydati nigri, boli albæ lævigatæ, ana 10.0 grammes ($2\frac{1}{2}$ drachms); glycerinae, 8.0 grammes (2 fluidrachms); aquæ, 9.5 grammes ($2\frac{1}{8}$ fluidrachms). M. ft. bacillula 200, ut singula contineant, 0.05 gramme ($\frac{7}{8}$ grain) cupri oxydati. D. S.: A "bacillulum" once a day to a small-sized dog; twice daily to a large-sized one. To be given daily for a fortnight.

As Schaedler's analysis has proved, the black oxide constitutes the principal ingredient of a Berlin quack remedy against tape-worms, bearing the name: "*E. Kariq's Bandwurmmittel bei Kindern und Erwachsenen.*"

A number of communications advocating chloroform treatment have been published.

Roberts Bartholow ¹⁹_{Jan. 5, '96} reports a case in which, after failure of the usual remedies for tape-worm, a parasite, twenty-five feet in length, became dislodged, and was passed after the use of papain in 10-grain doses, three times a day, after meals. The worm had not undergone solution, but Bartholow thinks that the drug had exerted a toxic influence upon it.

Duhourcau ⁸⁷_{Jan. 31, '94} recommends the administration of capsules containing a minim each of male fern, chloroform, and castor-oil. From 3 to 12 of these are to be given in the morning, fasting, according to the age of the patient. Descroizilles ¹_{June 23, '94} considers the above an ingenious combination.

Leslie Ogilvie, of London, ⁶_{Aug. 4, '94} calls attention to the fact that many people who suffer from tape-worm pass large quantities of mucus in their stools, and as in all probability the worm is, to a considerable extent, covered by this, it is important to remove it so that the poison may reach the worm. He recommends for this purpose the administration, the night before treatment, of sulphate of magnesia, with tincture of jalap, instead of castor-oil.

John H. Grant, of Buffalo, N. Y., ⁹⁹_{Apr. 5, '94} reports several cases of toxic effects after the use of the oil of male fern.

NEMATODE PARASITES — ASCARIS; ENSTRONGYLUS; STRONGYLUS;
STEPHANURUS; DOCHMIUS; TRICHINA; FILARIA; DRACUNCULUS.

Ascaris lumbricoides, Linné (1758).—W. Schewiakoff, ⁵⁰_{Apr. 7, '94} of Heidelberg, confirms the views of Büttchli and Schneider that the modifications in the reproductive organs of nematodes are of no systematic value and are not to be used in classification. His studies of abnormalities in the female genital apparatus of *Ascaris lumbricoides*, L., show that the structure of these organs may vary very much within the species.

Giovanni Battista Buglioni ⁸⁷³_{Mar. 15, '94} communicated to the Società Romana per gli Studi Zoologici the details of a case of reflex meningitis due to the presence of *Ascaris lumbricoides*. The severe symptoms of cephalalgia,—disturbance of vision, delirium, rigidity of neck, etc.,—which resisted bleeding, vesication, calomel, etc., gave way immediately upon the administration of santonin.

C. Giarrè, of Florence, ³⁷⁶_{No. 19, '93} calls attention to a case of grave infection with ascarids in a child of geophagous habits; demonstrating the fact that an intermediate host is unnecessary in the

case of this parasite, sustaining the views of Kuchenmeister, Davaine, Richter, and Epstein, in opposition to those of Leuckart and von Linstow. Th. Omeltschenko ⁵⁸⁶_{No.37,'93}; ²¹_{Dec.23,'93} describes the finding of cholera bacilli in the intestinal contents of ascarids removed from the body of a cholera patient. Miller ³⁶⁶_{B.36,p.33,'93} records an interesting case of the discharge of a lumbricoid worm, eighteen centimetres in length, from an umbilical fistula in an infant 3 weeks old. Authorities are divided upon the point whether ascarids are able to perforate intestinal walls. Mondière, Leroux, Siebold, and Leuckart affirm this to be possible, while Rokitansky, Küchenmeister, Lebert, Bremser, and Rudolphi are as positive on the opposite side. Miller does not admit the possibility of such perforation in the present case, believing that the parasite came from the bowel by a fistula already formed. Mouschet ¹⁰⁰_{June 14,'94} reports a case of a discharge of an ascarid from a lumbar fistula eleven months after an incision for perinephritic phlegmon. Alfred Waring, of Nottingham, ²_{Dec.23,'93} reports a case of the simultaneous presence of tænia and ascarids.

Henry Alston, of Trinidad, ⁶_{Sept.30,'93} confirms his previous statements ⁶_{Feb.11,'93} as to the improbability of the theory that ascarids have anything to do with the production of rickets. Gouraud and Martin-Durr ¹⁰⁰_{No.79,'93}; ¹_{Dec.2,'93} report a case of ecephyladitis (appendicitis) due to an accumulation of ascarids in the vermiform appendix. George Foy ²²_{July 11,'94} calls attention to somnolency in the young as being due to the presence of ascarids. A. N. Krishnaswamy Moodeliar, of Tarikere, ²³⁹_{July 16,'94} inveighs against treating suspected cholera cases in a routine manner, and records the case of a Brahmin who exhibited all the symptoms of cholera collapse, which were relieved by the administration of santolin and castor-oil.

Enstrongylus gigas, Diesing (1851).—Lilien ⁶⁹_{Apr.19,'94} exhibited a specimen, thirty centimetres long, of this parasite from the pelvis of the kidney of a dog. Pasquale Moscato ⁵⁸⁹_{Sept.26,'93} reports a very interesting case of chyluria with complicated nervous symptoms (hysteria) the cause of which was made clear by the expulsion of a specimen of *Enstrongylus gigas* nine centimetres in length and four millimetres in diameter.

Strongylus convolutus, Ostertag (1890).—C. W. Stiles ⁸⁸¹_{'94} recurs again to his criticism of the use of the specific name *convolutus* under this genus, the parasite originally so designated

having been transferred by Schneider to the genus *Pseudalius*. He bases his use of *Strongylus Ostertagi* upon the rules of nomenclature set forth in the "A. O. U. Benennungsgesetz," Blanchard's article "Ueber die Benennung organischer Wesen,"²¹¹⁵₈₉ and the "Règleo de la nomenclature des Etres organisés" of the International Zoölogical Congress (Paris, 1879; Moscow, 1872).

Stephanurus dentatus, Diesing (1843).—P. S. de Magalhães, of Rio Janeiro, ⁵⁰_{Aug. 25, '94} after examination of specimens furnished by Moraes Barros, expresses himself in favor of referring this parasite of the hog directly to the genus *Strongylus* as *S. pingicula*.

Dochmius duodenalis, Leuckart (1876).—Statements as to the occurrence of *Dochmius duodenalis* in dogs, as those of Oswald Baker and others, seem to be based on errors of observation, according to the recent examinations by St. von Ratz ⁷⁴⁰_{B. 16, p. 434, '93} of a number of dogs suffering from dochmiasis (pernicious anæmia of packs of hounds), which show that the parasites belong to two species,—*Uncinaria trionocephala*, Rudolphi; and *U. stenocephala*, Railliet. In no case did von Ratz find *Dochmius duodenalis* in dogs. Recent papers by A. Satta and J. Inouye ²⁰⁰_{Feb. 24, '94} call attention to the fact that dochmiasis is spreading throughout Japan. Cases of dochmiasis are reported from Italy by Finzi, of Badia ⁴⁷²_{Nov., '93}; ³¹⁹_{Aug. 25, '94}; by Abbamondi and Cipolloni, of Spezia ⁵³¹_{May, '94}; and by Tinozzi, of Naples, ⁵⁸⁹_{Apr. 18, '94} the latter being the first case recorded as originating in Naples. H. Chiari reports ⁸⁸_{No. 44, '93}; ⁵⁰_{Mar. 2, '94} a case of this disease in Prague, in a negro from Liberia, which is interesting, in view of Sandwith's statement that the disease is rare among negroes. Grawitz ⁴_{Sept., '93} reports the first case of dochmiasis in the neighborhood of Berlin, in a bricklayer. This disease is rare in America, and a case reported by Blickhahn, of St. Louis, ⁹_{Dec. 9, '93} in the person of a German immigrant, and one by Herff, of San Antonio, Tex., ¹⁴³_{June, '94} in the person of a native Mexican, are accordingly of interest. Dobson ²_{Oct. 7, '93} withdraws his support of the etiological rôle assigned by Giles (see ANNUAL, 1893, vol. i, E-20) to this parasite in kala-azar, or the so-called beriberi of Assam.

F. M. Sandwith, of Cairo, Egypt, publishes a very valuable paper entitled "Observations on Four Hundred Cases of Anchylostomiasis."⁶_{June 2, '94} He refers to the disease as one which is sapping the life of the peasant class in Egypt, and he is convinced that to it is due nearly all the anæmia of adult males among the

lower orders there. A fact which will interest neurologists is the complete absence of knee-jerk in fully one-half the cases noted, while impotence seems to be a decided symptom of the disease. Sandwith regards it as a waste of time to administer any other anthelmintic than thymol, which he regards as a specific remedy, reporting 9 per cent. of his cases cured. It is given as follows: The day before and the day after the thymol the patient is kept on a diet of milk and soup. Two grammes (31 grains) of thymol in a wafer are administered at 8 A.M., with 25 grammes ($6\frac{1}{2}$ fluidrachms) of brandy; at 10 A.M. another dose of 2 grammes (31 grains) of thymol is given; at 12 a dose of castor-oil follows. The thymol treatment is repeated once or twice, until not an egg can be found in the fæces with a microscope. Egyptian statistics ³⁶_{Jan., '94} ⁶_{July 28, '94} confirm the above statement as to the prevalence of this disease in Egypt. It is stated that the thymol treatment has now been adopted in the Egyptian army-hospitals. The disease is confined almost entirely to men.

Trichina spiralis, Owen (1835).—P. Cerfontaine ³⁵⁶_{v. 13, No. 1} ⁵⁹_{May 19, '94} announces, as a result of a recent study of trichinosis during an epidemic of this disease in Belgium, a fact that appears to be new, viz., that a certain number of the female trichinæ penetrate into the wall of the intestines and even into the mesentery. These have more chance of infecting the organism than those which remain in the intestinal canal. This discovery also explains the violence of the gastro-intestinal troubles which often characterize the beginning of trichinosis. The investigation of Askanazy confirms ⁵⁰_{Feb. 15, '94} ²_{June 16} the above statement of Cerfontaine. Sections of the intestine of infected rabbits showed that the female parasite penetrates into the villi and mucous membrane generally, not deeper, however, than the muscularis mucosi, and lies in that membrane or a chyle-vessel. The investigation would appear to show that young trichinæ are deposited in the lymphatics and are carried away by the lymph-stream. The discovery of embryos in the mesenteric glands (Virchow and Gerlach) is in accord with this opinion. The old view, that the embryos of trichinæ are deposited in the lumen of the bowel and subsequently bore their way through its wall, is opposed by these investigations of Cerfontaine and Askanazy.

Frank J. Thornbury, of Buffalo, ¹⁷⁰_{Jan., '94} in referring to the

pathology of trichinosis, reports that 14 per cent. of the bodies examined in the Buffalo dissecting-room proved infected. He suggests that a great many cases of obstinate chronic rheumatism are due to infection with this parasite.

As the result of recent experiments C. W. Stiles ²¹⁰⁸_{Nov., '94} is inclined to look upon the spermophiles as an unimportant factor (like the rabbit, for instance) in connection with trichinosis. From his studies on American trichinosis he is led to make the following remarks: "European authors, who state that it is customary for the Chicago, Omaha, and other large American pork-packers to feed offal to swine at their abattoirs and spread the disease in that way, are entirely in error. This custom of feeding offal does exist among small local country butchers, but I have yet to find any of the packers who ship pork to Europe feeding offal at their abattoirs."

Filaria sanguinis hominis, Lewis (1872).—Peter Bancroft, E. S. Jackson, and Thomas L. Bancroft, ²⁶⁷_{July 15, '94} of Brisbane, Queensland, present the result of their investigations into the increase of white corpuscles in filarial blood. Leucocytes in health are considered decreased when less than 4000 and increased when over 10,000 to the centimetre. The normal range is from 1 in 1250 hæmocytes to 1 in 350. A general average of many estimations that have been made is 1 in 655. Chiefly owing to the comparative fewness of the leucocytes in filarial blood (*i.e.*, compared with leucocythæmia and allied diseases), no attempt was made to ascertain the reaction of their granules. The results are:—

	Leucocytes to the Cm.	Hæmocytes to the Cm.	
Case I	23,750	5,360,000	1 in 225
Case II	12,000	6,000,000	1 in 500
Case III.	27,300	6,000,000	1 in 220
Case IV	21,500	6,000,000	1 in 280
Case V	14,500	4,600,000	1 in 318
After treatment	12,000	5,300,000	1 in 442
The worst case of elephantiasis in Queensland.			
Case VI	5,500	3,620,000	1 in 660

T. L. Bancroft, ⁶_{Sept. 30, '93} at a meeting of the Queensland Medical Association, submitted some deductions concerning the life-history of *Filaria sanguinis hominis* somewhat at variance with the well-known and generally-accepted conclusions of Manson. Bancroft

holds an intermediary host to be unnecessary to the development of the filariæ, believing that they propagate like ordinary nematode intestinal parasites and that their life-cycle can be completed in one host.

Saussure, of Charleston, S. C., ¹_{Oct. 7, '93} demonstrated to the Pan-American Medical Congress the filaria found in the blood of human beings and dogs in Charleston. His investigations go to show that filariasis is not confined to the colored people, but is to be found in the whites living in the same locality. He held that there could be no doubt that the disease was rapidly increasing in Charleston. Colored males were found to be more susceptible to it than females. Dogs in the South frequently die from drop-sical diseases and general anasarca, autopsy revealing the adult worm. The President of the Congress reported a case of filariasis which had recently come under his notice in Canada. The patient had lived all his life in one district, and so far as was known had never come in contact with people of tropical climates that might have had the disease. In the case of a negress, whose blood during pregnancy showed the presence of filariæ, the parasites disappeared during labor, and did not re-appear in the mother nor appear in the child until thirty days after confinement, when they were present in great quantities.

The observations given here are confirmatory of those by the same author previously presented (see ANNUAL 1892, vol. i, F-13).

Laveran, of Val-de-Grace, ¹⁴_{Nov. 12, '90} describes the case of an officer, recently returned from service in New Caledonia, Tonkin, and the Soudan, who exhibited symptoms of intermittent fever, with none of the ordinary lesions of filariasis. The examination of the blood, instead of demonstrating the usual hæmatozoön of paludism, revealed the presence of filariæ. Experiments with solutions of quinine (1 per cent.) and of methyl-blue showed that the embryos died in a few seconds in the quinine solution, but survived for twenty-four hours in the methyl-blue solution. Treatment with quinine was therefore adopted, and proved effective.

M. Font, of Barcelona, Spain, ⁴⁵⁶_{Feb. 25, Mar. 10, '94} ⁵⁰_{July 9} describes the first sporadic case of filariasis in Europe and gives the entire history of *Filaria sanguinis hominis*. The photomicrographs of the parasite, showing its relative size to the surrounding blood-corpuscles,

are excellent. J. H. Whelan, of Zanzibar, ²_{Dec. 2, '93} suggests that the elastic membrane, within which the young *F. sanguinis hominis* is inclosed during its stay in the circulating fluid, is to protect the soft, semigelatinous body of the embryo from the attacks of the phagocytes, and that it may also protect the embryo, on first entry into the mosquito's stomach, from the corrosive action of the digestive juice. Whelan is wrong in supposing that Manson "failed to inquire into the uses of this elastic membrane." We quote Manson in respect to this point ²_{Apr. 15, '93}: "In what way can such a clumsy covering subserve the interests of the parasite? As I have elsewhere pointed out, the sheath in which the filaria lies and moves about is really the remains of the egg-shell of intra-uterine life. Why then is it not discarded before the birth of the embryo and its appearance in the blood-stream as a free-swimming and independent organism? I believe the reason for this anomaly in development is that the loose, trailing sheath is intended to prevent the filaria from using its formidable boring apparatus on the walls of the blood-vessels of the human host. This, which I may describe as a muzzling arrangement, is not made in the interests of the human host, but with a view to the well-being and future of the parasite itself; for, were the latter permitted to ply its weapons on the blood-vessels and escape thus into the perivascular tissues, it would miss its chance of being transferred to the stomach of a friendly mosquito and thus obtaining an opportunity to advance its development."

Hayman Thornhill, of Uva, Ceylon, ¹⁷⁴_{July, '93} contributes several interesting papers on the existence of *Filaria sanguinis hominis* and its probable relation to certain diseases in Ceylon. It is clear, from the cases cited, that this parasite is found in Ceylon and that it is confined to the districts of Galle and Matara,—a narrow geographical distribution which corresponds with the observations of Wickham Myers, of South Formosa, that, although many persons affected with filariasis came over to the island of South Formosa from the mainland of China, yet the disease never spread to the inhabitants of the island itself,—a fact which he explained by the absence from that island of the proper filaria-breeding mosquito. To the disorders of the lymphatic system enumerated by Bancroft, of Brisbane, and by Sir Joseph Fayrer, in his work on "Tropical Diseases" as associated with, if not caused by, filariæ

[nævoid and simple elephantiasis arabum, perhaps elephantiasis græcorum (*cf.* ⁶_{Feb.1,79}), chyluria, hæmaturia, anæmia, hydrocele with milky fluid, varicocele, elastic tumors in axilla and groin (*Helminthiasis elastica*), lymph-vesicles bursting in scrotum and abdomen, certain skin diseases (craw-craw); abscesses of scrotum, of glands of neck (like struma), of the lymphatics of the arm and thigh; intra-pelvic abscess, cerebral abscess and other lesions of the brain, peculiar steatoma of face, venous varix, deafness, eye disease], Thornhill adds frambæsia (yaws, parangi),—that deadly disease of Senegambia and the Congo,—the African lethargy, or sleeping sickness, the “dermatose parasitaire” of Nielly, and the verminous tumors of the integument, the contained parasites of which Leuckart described in 1891 as *Filaria volvulus*. It is also suggested that this latter may be the parent form of *Filaria sanguinis hominis diurna*. Thornhill points out that, filariæ not being always found in the blood in cases of fully-developed elephantiasis, many doubt the filarial origin of the disease; and he replies to this that, in elephantiasis proper, it is probable that the parent-worm is often, if not always, choked by the stagnating lymph and dies, and hence the embryo filariæ disappear. When the hæmatozoa are found in these cases, they are probably the progeny of a second worm. The presence of the hæmatozoa in cases of elephantiasis should be the exception rather than the rule; and this is what we actually find to be the case. It must further be borne in mind that filariæ are not always present in chyluria or lymph-scrotum, and that their absence in these cases is in like manner explained by the death of the adult worm.

Thomas L. Bancroft, of Brisbane, Queensland, ²⁶⁷_{Aug.15,'93} presents his arguments for doubting the statements of Manson and others as to the mosquito acting as the immediate host of the *Filaria sanguinis hominis*. E. S. Jackson ²⁶⁷_{Aug.15,'93} is inclined to regard delayed menstruation in girls and late arrival of puberty in boys as probably due to this parasite.

The notes of J. Maitland and Patrick Manson ²_{Apr.21,'94} on a case of malarial disease are of much interest and bring to light new facts regarding the behavior of these parasites. The case was one in which lymphangitis of the lower part of the inner surface of the left upper arm followed a blow in that region. The thickened tissue was removed by excision, and upon examination large numbers of

adult filariæ were found intimately associated with one another,—such a number as have never been found in one individual. The most important feature ascertained by Manson's examination is the structure of the caudal end of the male worm, which hitherto has never been seen quite intact. The zoölogical features of the worms are carefully described and illustrated by Manson, who, in concluding, remarks that "it is evident that much work has yet to be devoted to the blood-worms of man before the subject is thoroughly worked out or understood. Already we are partially acquainted with at least four species, possibly five; observers must therefore exercise great care in arriving at a diagnosis of any blood-worm they may encounter, and must always be alive to the possibility of its being a species other than the common *Filaria nocturna*." Manson concludes, from comparison of the above parasites and those sent to him by Neuman, of St. Vincent, W. I., with those described by Magalhaes, that the latter belong to a quite new species.

Filaria imitis, Leidy.—Bolton G. Corney ⁶_{Jan. 27, '94} describes the frequency of this parasite in the dogs of Fiji. Except in one or two favored localities every dog in Fiji falls a victim sooner or later to these filariæ, but it is somewhat strange that bitches resist longer than male dogs. It is his opinion that the ova acquired by the fœtus from the blood of a pregnant bitch may prosper and develop after the birth of the pup, but the symptoms (a peculiar barking cough which ends in a spasmodic hawking up of frothy mucus, and sometimes in vomiting, progressive emaciation, distressing dyspnoea, and syncope) do not usually manifest themselves in puppies of less than 6 months, though the baby-filariæ are easily detected in the blood. Thornhill ¹⁷⁴_{July, '93} refers to the frequency of filariasis among the dogs of Ceylon, and in the same journal the very interesting report of Patrick Manson ²¹¹⁶_{p. 6} on the hæmatozoa in China, is quoted, as showing that *Filaria imitis* exists in about one-half of all the dogs in China. *Spiroptera sanguinolenta*, Rudolphi, is also shown to be of very frequent occurrence.

Filaria uncinata, Rudolphi.—Otto Hamann, of Göttingen, ⁵⁰_{Oct. 28, '93} identifies the fresh-water copepod crustacean, *Daphnia pulex*, Rich., as the intermediate host of *Filaria uncinata*, Rudolphi, the cause of a fatal form of filariasis (*Filarienseuche*) in young geese.

Dracunculus medinensis, Cobbold (1864).—Casteuil ⁴⁶_{May 15, '94} re-

ports a case of Guinea worm in a soldier returned from service in Tonkin and Dahomey. The attempts to remove the parasite by direct incision proved unsatisfactory, the worm being traced along the extensor tendons to the external border of the foot, where it was broken and lost. Reference is made to Fesschenko's theory of infection through water containing cyclops.

Treatment of Guinea Worm.—Davidson²¹¹⁷ points out that the old-fashioned treatment of Guinea worm—by rolling it out, bit by bit, on a piece of wood or diachylon—is a dangerous and unscientific procedure, and, if instituted too early, is a violent and clumsy interference with nature and with the normal process of parturition in the parasite,—an interference which is sure to end disastrously in the rupture of the worm and in the extravasation of myriads of living and very active embryos deep in the tissues of the unfortunate human host. When a Guinea worm shows herself at the surface of the body she is there with a purpose. At this stage of her existence she is practically nothing but an enormously elongated cylinder packed from end to end with myriads of embryos awaiting freedom and an opportunity to develop. This opportunity comes when the worm has drilled a hole in the derma and the bulla which forms over this little hole has ruptured. Then, in response to the stimulus of cold water (the medium in which the young of the Guinea worm pass the first stage of their further development), the long, musculo-cutaneous cylinder containing the delicate, embryo-laden uterus contracts. This contraction forces a short piece of the uterus through the mouth of the parasite, the head of which is now lying either just inside or just outside the little hole alluded to. The prolapsed piece of uterus, becoming very tense by the contraction of the parasite, quickly ruptures, its contents flowing out over the surface of the ulcer; in this way installments of embryos escape from time to time. The worm has no vagina, this organ having been obliterated by the overgrown uterus, probably at an early stage of development. Nature has, therefore, been driven to utilize the mouth, in lieu of vagina, in the way described. By a repetition of this process of protrusion and rupture of small portions of the uterus, in the course of a week or two, the worm gradually empties herself. She then emerges spontaneously, or can be very easily withdrawn.

Emily, of the French navy, ¹⁹⁵_{June, '94} advocates a treatment of Guinea worm which, if it succeed in other hands as well as it appears to have done in his, will entirely supersede the rolling-out treatment and the expectant treatment referred to. He applies to the Guinea worm the method Mesnard has successfully employed in hydatids,—namely, injections of perchloride of mercury (1 in 1000),—with the view of killing the parasite, the dead body of the worm being subsequently absorbed in the same way as a piece of sterilized catgut would be. Emily, in a small garrison of 220 men at Bandiagara, on the Niger, in the course of three months had to treat 105 cases of Guinea worm; so that he speaks from large experience. As each case treated in the ordinary way involves three or four weeks on the sick-list, it is a matter of importance to popularize, in districts infected by the Guinea worm, such as the Deccan and other parts of India, as well as the West Coast of Africa, a method of treatment calculated to shorten this period as much as possible. Emily says that he obtains a perfect cure in three or four days. His results and methods have, therefore, much interest for naval and military surgeons. He divides his cases into three categories: first, those in which a hard swelling, associated with some pain and cord-like convolutions under the skin, indicates the presence of a Guinea worm about to break through; secondly, a similar, but fluctuating, swelling, indicating that the process has advanced still farther; thirdly, those in which this process has been completed, and part of a Guinea worm is protruding from a hole on the ulcerated surface of the limb. The first is the most hopeful for successful and rapid cure. He simply injects—and only once—a Pravaz syringe-ful of bichloride-of-mercury solution, in fractional quantities, by several insertions of the needle into the swelling, making the punctures as near the assumed position of the body of the parasite as possible; this plan he follows in the first and second types of cases. In the third type he injects, by puncturing it, the protruding body of the parasite itself, and any swelling in the vicinity of the opening from which it is hanging. In the last instance the parasite can be easily withdrawn on the day following the injection; in the other two cases the swelling rapidly disappears, and nothing is ever seen of the worm, which presumably has been killed, and is subsequently absorbed.

Felix Roth,⁶_{Mar. 31, '94} recommends the following plan: "A long, grooved, blunt-pointed probe is passed along the burrow, and, where it ends or where the burrow takes a sharp twist or sinks deeply into the fleshy parts, the skin is nicked and the probe passed through. Then a sharp scalpel is drawn along the probe and the wound is laid well open. The superficial veins are cut and, if necessary, ligatured; the large cutaneous nerves are, wherever possible, spared. All the burrows are treated in the same manner. Long strips of lint soaked in carbolic-acid lotion (1 in 15) are laid in the opened wounds. The whole limb is then surrounded with a lint compress soaked in the same carbolic-acid lotion, covered with oiled silk and wool, and tightly bandaged. Every twenty-four hours the limb is dressed and the Guinea worm is, as a rule, partly expelled on to the dressings. Very often slight traction in the line of the burrow may draw it completely out; no force should be used, as it may easily be broken. After the second or third dressing the worm in every case came away. The limb should be well supported and raised and a good purge given." John Randle, of Lagos, West Africa,⁶_{Jan. 20, '94} recommends carbolized poultices, constant traction, and the unsparing use of Paget's knife.

Charles Forbes, late Surgeon of the Warsa Gold Mines, contributes⁶_{Feb. 24, '94}²³⁹_{May 16, '94} an interesting paper on the Guinea-worm infection, which he attributes to drinking foul river-water. He says: "My method of radical cure is purely medical and very easily carried out, the plan being to impregnate the tissues of the patient with precipitated sulphur or the chemical compounds to which their ingestion gives rise. This has proved eminently successful in my later cases (thirty-two in number), these being solely treated as follows: One compound-sulphur tabloid (Sir A. B. Garrod's formula) to be taken every four hours daily, for at least ten days, at the end of which period success has generally become assured, with abatement of all symptoms. When, as in these cases, I was able to keep the patients under observation for about three weeks, the result was invariably good." William Huntly, of Kotah, Rajputana,²³⁹_{June 16, '94} referring to the above article, questions the advisability of applying the term "radical cure" to the use of sulphur, which he has, however, found beneficial. He recommends the employment of hypodermatic injection of cocaine

(15 to 20 minims—1 to 1.3 cubic centimetres—of a 4-per-cent. solution) into the channel occupied by the worm, which is then removed by traction.

D. S. Kellicott, of Columbus, Ohio, ⁶¹_{June 9, '94} holds that *Æsophagostoma Columbianum*, Curtice, which in its mature stages produces the nodular disease of the intestines of sheep, is evidently of wider range than was formerly supposed.

Trichocephalus.—According to the statistics presented by Heisig, ⁵⁰_{Mar. 2, '94} *Trichocephalus* is shown to be by far the most frequent nematode parasite in the cases examined by him, occurring in 104 cases out of 230.

Ectoparasites.—A. S. Packard ²¹¹⁸_{V. 6, No. 1} identifies the hen-fleas, which were reported by Lawrence C. Johnson ²¹¹⁹_{V. 1, p. 59} as causing much damage to young chickens at Gainesville, Fla., as *Sarcopsylla gallinacea*, Westwood, of which previous specimens have been described from Ceylon ²¹²⁰_{V. 11, p. 246} and Turkestan. This wide geographical distribution is supposed to be due to its being carried about from one region to another by birds.

J. S. W. Thudicum ²²_{Aug. 1, '94} gives an original communication on *Demodex folliculorum* as the parasite causing the mange of dogs, and its transfer upon man. The article is well illustrated with engravings of the parasite obtained from a deerhound, and has appended a list of the earlier writers on the subject. This bibliography is very incomplete, as is the list of synonyms, and errors in synonymy are made in the references to the mites of the horse and dog. *Sarcoptes hippopodus* refers to the parasite now designated *Glyciphagus cursor*, Gervais; while *Sarcoptes cutorum* should read *Sarcoptes notedres*, Delafond and Bourguignon.

Pseudoparasites.—Abbamondi and Cipolloni ⁵³¹_{May, '94} report a case of intestinal parasitism from larvæ of *Sarcophaga hæmorrhoidalis*, the abundance and varying size of which they attribute to the rare form of parthenogenetic reproduction termed hedogenesis.

H. H. McNally, of Millville, N. B., ²⁸²_{Nov., '93} reports a case of a 4-month-old infant from the umbilicus of which he removed “a plump and active bot.”

DISEASES OF THE KIDNEYS, BLADDER, AND ADRENALS; URINALYSIS.

By M. LANNOIS, M.D.,

LYONS.

DISEASES OF THE KIDNEYS, BLADDER, AND ADRENALS.

ANATOMY AND PHYSIOLOGY OF THE KIDNEYS AND BLADDER.

Twceedy ¹⁶_{June 1, '94} mentions a case of single kidney in a woman 31 years of age. The left kidney existed alone, and was voluminous in size; the vessels were normal as well as the ureter, though larger than usual. On the right side there was no trace of kidney, vessels, or ureter. In a man, 47 years of age, Jump ¹⁴⁷_{Apr., '94} noticed the presence of two supernumerary kidneys situated above and behind the normal kidneys, and, though distinctly separated, seeming to form part of them. They were half the size of the normal organs, and possessed distinct vessels and ureters opening directly into the bladder. The ureters were distended and the supernumerary kidneys themselves showed signs of hydronephrosis. The fact that the ureters opened into the bladder on a level with the prostatic ureter, added to the absence of prostatic vesicle, leads the author to suspect the persistence of Müller's ducts. Brown ²⁷⁷_{Jan., '94} classifies the abnormal condition met with in the kidneys under seven headings: 1. Kidneys normal in position and size, but altered in form. 2. Kidneys normal in position, but altered in relative size. 3. Variations in number (cases of congenitally single kidney, which are very rare; cases of supernumerary kidneys). 4. Variations in position,—*i.e.*, displacements. 5. Malformations. 6. Variations of the ureters. 7. Vascular abnormalities.

Vanni ⁵⁹⁶_{Nov., '93} studied the action of the vagus on the kidney. As regards the secretory function, he admits with Butte and Arthaud that, under the influence of the excitation of the pneumogastric, the elimination of water is either diminished or altogether arrested,—a circumstance which he ascribes less to direct action upon the

kidney than to a diminution in general arterial pressure. He likewise studied the trophic action of the vagus by means of unilateral section at the neck, of section of one or both of the sub-diaphragmatic branches, of experimental neuritis of the vagus, and could only find slight modifications proportional to the abolition of the constricting vasomotor action of the vagus upon the kidneys. His opinion differs, therefore, from that of the authors alluded to, who always found epithelial and interstitial lesions. Besides, Vanni always noticed that experimental neuritis of the vagus was followed by more or less permanent albuminuria, invariably accompanied by rather slight azoturia; but in no case could he notice the slightest trace of glycosuria.

M. v. Zeissl⁵⁷_{Jan. 28, '94} investigated the action of excitation of the hypogastric and internal pudic nerves and the muscular effect thus produced. Excitation of the internal pudic nerve causes contraction of the body of the bladder and relaxation of the sphincter, this being really due to direct action upon the sphincter, and not the passive result of contraction of the evacuators. On the contrary, excitation of the hypogastric nerve causes contraction of the sphincter. Excitation of the central extremity of the sciatic, cubital, median, radial, phrenic, and splanchnic nerves produces, in a reflex way, contraction of the evacuator muscle of the bladder and relaxation of the sphincter. Like results cannot be obtained by the excitation of the pneumogastric.

Bazy¹⁰⁰_{Dec. 5, '93} caused rapid death in animals by injecting into the bladder large doses of chemical poisons (cocaine, strychnine, hydrocyanic acid) or of microbial poisons. In the course of an experiment made before the Société de Biologie he injected into a rabbit 0.02 gramme ($\frac{7}{8}$ minim) of a 1 to 20 solution of sulphate of strychnine; in a few minutes convulsions set in, followed by death. His conclusion is that the absorbent power of the bladder is undeniable. Boyer and Guinard²²_{July 18, '94} reject this assertion and show that a large number of poisons—such as pilocarpine in doses of 10 grammes ($2\frac{1}{2}$ drachms); atropine and eserine, 10 grammes ($2\frac{1}{2}$ drachms); cocaine, 10 grammes ($2\frac{1}{2}$ drachms); morphia, 10 and 15 grammes ($2\frac{1}{2}$ and $3\frac{3}{4}$ drachms); veratrine, 0.05 gramme ($\frac{7}{8}$ grain); arseniate and hydrochlorate of strychnine, 0.03, 0.05, and 0.10 gramme ($\frac{1}{2}$, $\frac{7}{8}$, and $1\frac{3}{4}$ grains)—may be injected into the bladder, either through the urethra or directly after liga-

ture of the urethra, without manifesting any evidence of the absorption of those alkaloids. The urine of the dogs so injected with strychnine was collected, reduced, and injected into frogs, guinea-pigs, and a rabbit, death supervening in all, with the classical symptoms. The mucous membrane of the bladder therefore forms an impermeable barrier to toxic matters.

By ligation of the renal vein of one side in a rabbit, Schilling¹²⁶_{July 15, '94} noticed, twenty-four hours later, a thick tumefaction on the other kidney. Forty-eight hours later the granulations of Altmann had undergone alteration in the epithelial cells of the convoluted tubules, their disposition being no longer radiating and their number being decreased. Those of the external segment were most affected. The granulations of Altmann thus afford clear evidence of the alterations undergone by the protoplasm in nutritive disturbances.

ACUTE BRIGHT'S DISEASE.

Etiology.—Lenzmann⁴¹_{Aug. 6, '94} mentions a large number of substances—such as cantharides, styrax, balsam of Peru, cubeb, turpentine, mustard- and croton- oils, naphthol, carbolic and oxalic acids, arsenic, phosphorus, mercury, etc.—which act upon the kidney as regular poisons by causing acute diffuse nephritis. Baatz³¹⁹_{Sept. 15, '94} observed two cases of acute nephritis in children 8 and 6 years of age, occurring after the use of β -naphthol ointment for the purpose of curing the itch; the youngest child died. He had only been rubbed six times, 25 grammes ($6\frac{1}{2}$ drachms) of ointment at 2 per cent. having been employed; so that he had only absorbed 3 grammes (46 grains) of naphthol at most. Welander³⁷⁰_{Feb., '94} in a paper based upon a great number of cases, examines the action of mercury upon the kidneys. There is always a certain degree of irritation of little importance, but sometimes a regular nephritis, with albumin and cylinder-casts, may develop. Mercurial treatment should thus always be carefully watched. Pernice and Scagliosi⁵⁸⁹_{June 2, '94} studied experimental nephritis consecutive to subcutaneous, peritoneal, or intra-venous injections of the bacillus anthracis, bacillus pyocyaneus, staphylococcus pyogenes aureus, and micrococcus prodigiosus. The result is glomerulo-nephritis; at first the cortical substance is alone involved, then the medullary. The initial process is endarteritis, with disorders of the circulation

and hæmorrhages of the glomeruli of Malpighi. The capsules of Bowmann and the epithelium of the tubes are affected next; the cells drop off, the tubes unite, presenting the symptoms of hyperplasia of the interstitial connective tissue; in case of cure there is a new formation of the uriniferous tubules (?). The elimination of the bacteria by the kidneys does not alone produce nephritis, which is also due to toxins.

Aufrecht¹²⁶_{July 15, '94} calls attention to a very grave nephritis supervening in the first seven days of scarlet fever, and thus differing from the late nephritis; to it must be ascribed the fatal termination sometimes noticed in the early stage of scarlet fever. There is, at first, coagulation necrosis of the epithelia of the tubuli and inflammation extending to the papilla. This alteration of the papilla constitutes the most essential characteristic; for, as in cholera, it leads to retention of urine and dilatation of the canaliculi. In the case cited by Gouget⁷_{Jan., '94} nephritis only appeared three months after the attack of scarlet fever. There was tuberculosis. Pearse¹⁰²_{Mar., '94} endeavors to distinguish nephritis consecutive to scarlet fever from that following upon diphtheria. Bâgin-sky¹⁵⁸_{B. 16, H. 3, 6, '98} examined for albuminuria in 279 cases of diphtheria, and found it in 131,—the rate of mortality being 50.37 per cent. No evidence of albuminuria could be discovered in 148 cases,—the rate of mortality here being 14.2 per cent. Cases free from albuminuria thus afford a more favorable prognosis. When tracheotomy has been performed, the presence of albuminuria has not so grave a significance. Albuminuria may be of a light or of a severe nature; in the latter case the quantity of urine diminishes rapidly; it contains a large proportion of albumin, as also an abundance of renal cells, leucocytes, cylinder-casts, and red globules. Besides those two forms of albuminuria (light and malignant), a third one should be classed apart,—that in which nephritis is co-existent with symptoms of general intoxication, paralysis, etc.

Siraud⁹⁹⁶_{Apr. 25, '94} publishes a case of subacute nephritis subsequent to an attack of simple herpetic angina, in a young girl 21 years of age. On the fifteenth day an eclamptic crisis suddenly set in, accompanied with anuria. A few drops of urine drawn with the catheter contained 5 grammes (1¼ drachms) of albumin per litre (quart). The crises became more frequent, coma set in, and the

patient died with broncho-pneumonia. Histological examination of the kidneys showed, on the tubular epithelia, an intermediate lesion with cloudy tumefaction and coagulation necrosis. Bock⁴¹_{Apr. 2, '94} relates an interesting case of hæmorrhagic nephritis consecutive to grippé, in a woman 32 years of age, the hæmaturia lasting three weeks. Thorough recovery ensued. A case reported by Bodin⁹⁹⁶_{Sept. 10, '94} is regarded as one of primary typhoid nephritis. Five days after entering Bodin's ward the patient, a woman 23 years of age, suffered from hæmaturia with lumbar pain and vomiting; the quantity of albumin passed was from 0.15 to 0.20 gramme (2¼ to 3 grains). Throughout the course of the malady the urine contained a large proportion of Eberth's bacilli, as shown by culture and cultivations. Examination of splenic blood gave negative results; in fact, the patient did not present any other symptoms of typhoid fever.

In a good general review, Fiessinger³_{May 12, '94} furnishes new facts in support of his theory that Bright's disease is an infectious disorder in which the micro-organisms act upon the kidneys. He distinguishes (1) hyperacute infectious Bright's disease, (2) acute infectious Bright's disease, and (3) attenuated infectious Bright's disease.

Baduel⁵⁸⁹_{Aug. 7, '94} mentions a case of primary acute hæmorrhagic nephritis, in a man 42 years of age, co-existent with the presence in the urine of large quantities of a real micro-organism,—the staphylococcus pyogenes albus. Paterson⁶_{Mar. 3, '94} relates four cases of acute nephritis occurring in three persons living in the same house and one residing in a neighboring dwelling. Upon strict inquiry, he found poisoning from sewage to be the original cause of the disease; facing the house inhabited by the first three patients there was a sewer-ventilator emitting most objectionable smells, of which people in the neighborhood had complained on several occasions.

Hermann²_{Jan. 13, '94} read, at a meeting of the London Obstetrical Society, a paper relative to six cases of pregnancy, with Bright's disease, of which he distinguishes two forms: the one hyperacute, with absence of premonitory symptoms, chiefly attacking primiparæ, no diminution in the quantity of urine and no massive albuminuria, producing convulsions and bringing about the death of the fœtus; the other is met with in older women, the prodroma lasting weeks or months; it is characterized by increase in the

quantity of the urine and less severe albuminuria; it may be unaccompanied by convulsions and very often becomes chronic. Murphy⁸⁰¹_{Sept. 1, '94} mentions a case of acute Bright's disease in a young woman, 22 years of age, in the fourth month of pregnancy.

H. Mollière²¹¹_{Feb. 25, '94} has observed acute and chronic nephritis in the course of diseases of the liver, and attributes them to the irritant action of the toxic products of the blood, which in the normal state are arrested and destroyed in the liver. A case of acute nephritis, which he mentions, occurred in an alcoholic patient with hypertrophied liver, presenting symptoms of biliary lithiasis; on the fifth attack of hepatic colic albumin was noticed in the urine, anasarca set in, and the patient died in twelve days from uræmia. The kidneys offered the typical characteristics of enlarged, waxy kidney.

Felsenthal and L. Bernhard relate fifteen observations of acute nephritis in infantile gastro-enteritis; three of the cases only were chronic, the others being cases of cholera nostras. The histological researches of the authors agreed in results with those of Aufrecht, who observed obstruction of the collecting tubules and of Henle's tubes, dilatation of the convoluted tubules, with flattening of the epithelium and subsequent parenchymatous lesions, the glomeruli not seeming much involved. They likewise compare the result of their histological examination with that obtained on the kidney in Asiatic cholera, considering both results as absolutely similar. Other papers on nephritis in children are published by Jacobi⁵¹_{Oct., '93} and Coffin.¹⁰⁶_{May, '91}

In a case of acute albuminuria in a young girl 17 years of age, Moret⁵⁷⁷_{Mar., '94} observed complete gangrene of the left leg. Recovery followed amputation. Lendon²⁶⁷_{Feb. 15, '94} mentions a case presenting all the classical symptoms of Bright's disease with the exception of anasarca. Having shortly before had occasion to make a post-mortem examination in which one of the kidneys was much more involved than the other, he infers that the absence of anasarca may be ascribed to the fact that one kidney alone is involved (acute mononephritis).

Cox¹⁶_{July, '94} relates two cured cases of acute Bright's disease in which he had employed diuretin in doses of 15 grains (1 gramme) three times a day. E. de Renzi⁵⁹⁶_{Dec., '93} specially commends the use of salol in nephritis of bacterial origin. In acute nephritis in

children Périer ²⁴_{Apr.29,'94} advises the following treatment: Rest in bed and strict milk diet; from one to two scarified cuppings on each side of the spine, with mustard plasters; every two hours 10 grammes (2½ drachms) of benzo-naphthol, and 10 grammes (2½ drachms) of milk-sugar in an infusion of cherry-stalks; morning and evening cold boiled-water enema; once or twice a week julep and scammony; dry friction of the body, and asepsis of the mouth.

CHRONIC BRIGHT'S DISEASE.

Etiology and Pathology.—Penzoldt ³⁴_{Oct.17,'93} has made new investigations into the etiological conditions of chronic inflammation of the kidneys. The examination of working-people before and after work, and of soldiers before and after drill, enabled him to notice, after violent muscular effort, an increase in the quantity of leucocytes and epithelial cells normally found in urinary sediment, and likewise the apparition of cylinder-casts. Hubach, one of Penzoldt's pupils, continued his master's experiments with alimentary substances. After the use of asparagus, horse-radish, 830 grammes (26½ ounces) of white and 800 grammes (25½ ounces) of black; tea, 12 cups, equivalent to 3 litres (quarts); coffee, 3 litres (quarts); English mustard, 200 grammes (6½ ounces). Red and white globules were seen in the urine and desquamation of the renal epithelium was noticed. Although the above substances were, in this case, used in excessive quantities, it is nevertheless a fact that their action on the epithelium of the kidneys and of the excretory ducts is of an irritant nature, and they must be forbidden in Bright's disease.

Hunter ¹⁰⁵_{Sept.15,'93} ranges the causes of chronic nephritis under the following heads: (1) chemical poisons; (2) infectious poisons; (3) constitutional or nutritive conditions; (4) diseases of the lower end of the ducts of urinary excretion; (5) obstruction in the circulation; (6) pregnancy; (7) psychical causes; (8) heredity; (9) cold and climate. Wm. A. Thom, Jr., ⁸¹_{May,'94} calls attention to excess of mental work as an etiological factor. The phosphates, which are eliminated in large quantities after cerebral activity, play, it seems, the part of irritant substances upon the kidneys, thus producing chronic inflammation. The relations existing between chronic nephritis and saturnism have continued to engross the attention of medical men. Hall ¹⁰⁷⁷_{Nov.29,'93} points out the frequency of

granular nephritis in file-cutters, who, it is known, are exposed to lead poisoning. W. Ebstein¹³_{Apr., '94} describes a mixed parenchymatous, degenerative, and proliferating interstitial nephritis in a man, 43 years of age, who suffered from saturnine colic and whose brain contained lead. De Grandmaison³¹_{July 18, '94} insists on the fact that, in lead poisoning, the renal lesion proceeds by gradual invasion, involving the urinary functions only in very limited portions of the kidneys.

Lemen⁶⁶³_{May, '94} admits the existence of chronic Bright's disease due to uric acid in excess passing through the kidney. Adami²⁸²_{July, '94} presented to the Montreal Medical and Surgical Society the kidneys of a dog suffering from chronic nephritis, ascribing the disease in that animal to exclusively nitrogenous food and absence of exercise. Similar conditions will produce nephritis in man. Moody⁶¹⁷_{July, '93} has made a collective investigation as to the prevalence of renal affections in Alabama, and concludes that such diseases are very common in that State. Stewart⁹_{Apr. 14, '94} admits that there is a non-albuminuric nephritis exclusive of the cases of typical fibroid kidney, such as described by Wilks, Mahomed, etc. He states that in such nephritis albuminuria may be completely absent, while signs of renal insufficiency, and even uræmia, may appear. The urine is diminished and sometimes highly colored, but there is no cardiac weakness. The persistence of increased blood-pressure and the absence of anasarca indicate that the oliguria is not of vascular origin. The density is normal or increased; a few hyaline or finely granular casts may be present; renal epithelium, oxalates, and urates are always in excess, and sometimes there are hæmatus and leucocytes. The total of the solids (urea and mineral salts) is diminished and uric acid normal or diminished. Cardiac hypertrophy does not always exist, but arterial tension is often increased. The disease usually terminates in uræmia, though there may be no œdema. Fienga⁵⁹_{Apr. 21, '94} says that no albumin is to be found in the urine in some cases of nephritis, as shown by the clinical symptoms and microscopical examination, and that such a nephritis may be due to the introduction of a specific virus from the external genitals. Gardner⁶_{Oct. 25, '93} reports an interesting case in which high vascular tension, pains in the head, and albuminuria followed a parallel course, and in which medication directed against the excessive tension gave good results. Dabney⁴⁵¹_{Nov., '93} claims

that, as a general rule, albuminuria is absent in the interstitial forms, while the skin is frequently dark in color in the parenchymatous forms. Austin⁴⁵¹_{Mar., '94} reports three cases, and A. James³⁶_{Apr., '94} publishes an excellent clinical lesson apropos of a case of primary contracting kidney.

Clarence King⁹_{Apr. 21, '94} has studied Bright's disease in children, finding that, although the acute form is not common, the chronic form is frequently met with, examination of the urine often giving the key to symptoms otherwise misunderstood and referred to the digestive tract or the brain. Potain,²¹²_{Aug. 10, '94} in discussing the case of a woman who had had three apoplectic attacks, studies the conditions in which hæmorrhage may occur in Bright's disease,—high tension, modifications in the structure of the arteries, and hypertrophy of the heart. Maire-Amero³⁷_{Mar., '94} has collected quite a number of cases in which œdema of the glottis was the only symptom of Bright's disease localized in the larynx. It occurs as an incident in the course of the disease, or, much more interesting, as the initial symptom of latent Bright's disease. A dozen such cases have been recorded. This œdema of the glottis may lead to death in several hours, being truly *foudroyant*. Copious bleeding and tracheotomy should be practiced as soon as possible.

Complications in the digestive tract are most frequent in Bright's disease. Fischer⁴¹_{Aug. 9, '94} examined 17 cases,—3 of large waxy kidney, 10 of secondary and 4 of primary contracted kidney,—and found intestinal lesions in most of them, from simple catarrh to diphtheritic exudation. By aseptically tying both ureters in rabbits he was able to demonstrate on the mucous membrane of the small intestine, the large intestine, and particularly the cæcum, hyperæmia, collections of round cells, and even lesions of the sub-mucous layer. These changes he attributed to the irritating action of excrementitious products eliminated by the intestine. Alapy, of Budapest,¹⁰⁸_{Oct. 15, '93} lays stress on the digestive troubles associated with diseases of the urinary apparatus and often disguising them. Dickinson²_{Jan. 13, '94} relates twenty-two cases of ulceration of the intestine coincident with renal affections, and eight cases of hæmorrhagic extravasation without ulceration. These ulcerations were situated at all points of the intestine, but especially about the ileum, their principal characteristic being that they were accompanied by hæmorrhage. In two cases there were

also ulcerations of the stomach. Such ulcerations may end in perforative peritonitis.

De Silva¹⁷⁴_{July, '93} reports a case of albuminuria with bradycardia, and J. Patton⁹_{Sept. 23, '93} two cases of chronic nephritis with cardiac complications. Chiaruttini⁵⁷_{Feb. 15, '94} states that the urea introduced into the circulation leads to a constriction of the vessels of the periphery, and, in order to demonstrate this, he measured the heat-giving power of a certain portion of the skin after the ingestion of 20 to 30 grammes (5 to 8 drachms) of urea dissolved in water. The diminished loss of heat was very distinct, and could only be explained by constriction of the vessels. Retention of urea causes elevation of vascular pressure and is the cause of cardiac hypertrophy in patients with Bright's disease. R. Petit⁷_{No. 12, '94} observed a reticulated condition of the aortic and pulmonary valves, explaining a presystolic murmur during life in a patient with Bright's disease who died of cerebral hæmorrhage. Williams²⁸²_{July, '94} found one kidney very much atrophied and lost in a mass of fat, the other granular and hypertrophic. There were no symptoms during life which could be attributed to the kidneys.

Schmaus and Horn¹²⁶_{Apr. 15, '94} describe the transformation of cyanotic induration of the kidneys into granular atrophy. Cyanotic atrophy has been observed by them at Munich more frequently among heavy beer-drinkers than any other class, though they have also met with it in cardiac and pulmonary disease. Areas of atrophy form in the cortical substance, corresponding principally to the interlobular veins and the arterial vessels. The alterations result from dilatation of the capillaries, and begin by thickening of the walls of the venules and arterioles, with simultaneous atrophy of the urinary canaliculi. Granular atrophy is at most but a more advanced stage in the development of cyanotic induration. Hollis²_{Dec. 3, '93} states that small granular kidney can be observed in malignant endocarditis and aortitis. He has noted in the renal tissue groups of nuclear bodies, smaller than the blood-cells, and forming connective tissue. The same nuclear bodies being found in the aortic walls, the theory is, in his opinion, admissible that they are carried by the blood-current into the kidney. Herringham, after examining the histological preparations presented by Hollis, claims that they represent only atheromatous aortic areas and ordinary interstitial nephritis. Israel,⁴_{Jan 29, '94}

in a case of interstitial nephritis terminating in cerebral atrophy, observed aneurismal dilatations of the cerebral arteries and an hæmorrhagic area filled with fluid blood, which might have been taken for an aneurism, and which was in reality due to rupture of the artery and successive hæmorrhages into the cerebral substance.

Diagnosis and Prognosis.—Fenton¹⁵_{May, '94} insists on the discrepancy existing between the clinical symptoms and morbid anatomy in diseases of the kidneys, especially in elderly persons, in whom the organs are much damaged without any symptoms appearing.

L. Green¹⁰⁵_{Oct. 1, '93} pronounces against the theory of a physiological albuminuria, and states that the diagnosis between the interstitial and parenchymatous form of nephritis should only be difficult when the last stage of the first becomes comparable to the first stages of the second. The error is, however, easily avoided. As to amyloid kidney, it does not deserve to be classed apart, as it is only a degenerative complication of chronic parenchymatous nephritis. He usually bases his diagnosis upon extrinsic symptoms, suppuration, and hypertrophy of the liver and spleen. Finally, cystitis is sometimes mistaken for nephritis, but the ammoniacal and purulent urine, as well as the absence of casts, will enable a correct diagnosis to be made. The prognosis is discussed by Adams,¹⁰⁵_{Sept. 19, '93} who lays stress on the importance of cardiac hypertrophy, which, favorable in the beginning, ends by exerting a harmful influence in favoring cerebral hæmorrhage. Heitzmann¹⁵⁰_{Nov. 16, '93} states that three forms are to be distinguished, viz., catarrhal, croupous, and purulent. B. Wilson¹¹⁵⁴_{May, '94} dwells on the necessity for early diagnosis in renal affections. As regards albuminuria, he admits the passage of albumin through the healthy kidney under the influence of pathological conditions elsewhere; but he believes that the albuminuria falsely called physiological,—the albuminuria of dyspepsia, of anæmia, etc.,—as well as that of adolescents, should always arouse grave suspicions. Hennessy,²¹⁶_{Aug., '94} in reporting several cases, insists on the grave prognosis that should usually be made. Bassett⁵⁹_{Apr. 21, '94} is of the opinion that rapid elimination of such substances as iodide of potassium, quinine, turpentine, and the bromides shows that the kidney is healthy, while delayed or diminished elimination gives sufficiently precise information as to the degree to which the organ is affected. The

reading of an interesting paper by Poore, at the Life-Insurance Medical Officers' Association of London, ⁶ June 16, '94 gave rise to an important discussion. Symes Thompson did not believe that albuminuria was always pathological; and, if albumin be not found at the second or third examination, he usually recommends the case for acceptance. Crosby also admitted the possibility of a temporary albuminuria. He first makes two or three examinations at intervals of a week, has the patient wait three months, and then rejects him definitely if the albuminuria still persist. Heron reported cases of albuminuria consecutive to such diseases as scarlatina, for example, lasting twenty years, without grave symptoms. Pollock also admitted a temporary albuminuria, as did Hoar and Ogilvie, and, together with Hingston Fox, recommended microscopical examination. On the contrary, Theodore Williams expressed the belief that insured patients who presented albuminuria died more rapidly than others, and Douglas Powell was of the opinion that quite young subjects who had albuminuria should be considered as below the average. Several of the speakers insisted on the necessity of having the patient urinate in the presence of the examiner, in order to prevent the substitution of other urine, as in a case reported by Mackenzie.

Treatment.—Gifford ⁶ Mar. 31, '94 accepts the views of Sir Andrew Clark on renal inadequacy, and recommends the ingestion of from two to six thyroid glands of the sheep per week. Under this treatment the density of the urine and the quantity of urea increase very sensibly. On the other hand, G. Johnson ² July 28, '94 contests the reality of renal inadequacy and attributes all the symptoms observed to defective digestion and assimilation. It is to this, and not to the kidney, that treatment should therefore be directed. Howship Dickinson ⁶ Feb. 10, '94 believes that patients suffering from renal disease should be removed to a warm climate with but slight variations of temperature. He prefers Algiers to the Riviera and Egypt and Luxor to both. Madeira also appears to him desirable. The report presented to the Minnesota Medical Society by Wells ¹⁰⁵ Oct. 1, '93 is an excellent exposition of the question of dietetic, climatic, and therapeutic treatment. The same is true of a less-extended article by Batten ⁶¹ Feb. 3, '94. Da Costa ⁹ Apr. 21, '94 reports three cases of nephritis treated by lactate of strontium, which he considers as an excellent diuretic in the acute forms and in acute attacks oc-

curing in the course of the chronic form. Battle ⁹_{Sept. 1, '94} also reports a favorable case. Gillespie ⁹⁰_{Sept., '94} observed a child, 5 years of age, who suffered from chronic Bright's disease and whose urine contained large quantities of serum-albumin and globulin. Lactate of strontium increased the quantity of urine and solids excreted and the patient rapidly recovered. Ryerson ⁷⁶⁰_{July 14, '94} praises lactose, having employed it successfully in forty-three out of forty-six cases. He remarks that the effect was not due to its diuretic properties, for he gave doses smaller than are required to produce a diuretic action, and, besides, it seemed to act better when isolated than when combined, as in milk.

Since Jendrassik demonstrated its action in cardiac dropsy, calomel has been neglected as a diuretic in renal affections. Dumin and Sklodowski, ¹²⁶_{July 16, '94} however, believe that it can cause the disappearance of œdema in renal disease by distinctly increasing diuresis; but it is impossible to say in advance whether it will or will not act in a given case. They have frequently found it effective in cases in which caffeine, vapor-baths, etc., were inactive; and they have also found its action to be the reverse. They prescribe it as follows: Calomel, 3 grains (0.20 gramme); opium, $\frac{1}{6}$ grain (0.095 gramme); sugar, q. s. to make one powder. Three to be taken daily.

Moritz ²¹_{Jan. 30, '94} treated a serious case of chronic nephritis, with œdema, in a young man of 20 years, by repeated scarifications during a period of seven months. These scarifications were made in the lower extremities and were from one to two centimetres in depth, antiseptic cotton being always carefully applied. During treatment cardiac hypertrophy developed and the œdema did not return. In a case of renal asthma in which venesection arrested imminent death, R. Kirk ²_{June 9, '94} had the blood examined by Haig, who found 0.015 per cent. of uric acid,—a distinct excess.

At the suggestion of Brown-Séquard, Teissier and Frenkel ²¹¹_{Apr. 29, '94} made injections of glycerin renal extract in patients suffering from albuminuria, finding that such injections had no diuretic action on the kidney and modified neither the specific gravity nor the globular composition of the blood. On the other hand, there was a slight increase of the urea, phosphates, and uric deposits, the urotoxic figure increasing from 0.205 to 0.252, without any modification of the albumin. The urine passed after the injections

caused myosis, which it did not do previously. This indicated an increased power of elimination of toxic substances.

Contrary to the general experience, Walling ¹⁹_{Nor., '93} reports a case of chronic Bright's disease in which the classical treatment was badly borne, and in which the best results were obtained from a diet consisting of finely-minced beef, butter, black-bread, tea, and coffee. Gilbert and Dominici ⁶_{Mar. 31, '94} give the results of their researches as to the effects of milk diet on the asepsis of the alimentary tract. An adult whose faeces contained 67,000 germs per cubic millimetre was subjected to milk diet for five days; the number of germs fell to 14,000, 5,000, 4,000, and 2,500 per cubic millimetre. The weight of the faeces having changed at the same time from 175 to 73 grammes ($5\frac{1}{2}$ to $2\frac{1}{3}$ ounces), it thus appears that the number of germs eliminated fell from 12,000 millions to 164 millions. The same results were obtained in experiments on dogs and rabbits, and go to explain the effects of milk diet in certain forms of dyspepsia with putrefaction, affections of the liver, and especially in Bright's disease and uræmia. Vergely ¹⁸⁸_{No. 42 et seq., '93} protests against the uniform and unreasoning use of milk diet in every case of albuminuria, and shows that it is insufficient for an adult, since 4 litres (quarts) of milk furnish but 200 grammes ($6\frac{1}{2}$ ounces) of carbohydrates, the quantity necessary for an adult in a state of absolute repose being, according to Smith and Playfair, 330 grammes ($10\frac{1}{2}$ ounces). Only weak and lymphatic subjects can support a diet of 4 litres (quarts) of milk daily, and then only when they remain in bed and use milk from cows specially fed for the purpose. This quantity of milk increases arterial tension and diuresis, and also increases the amount of urea, extractive matters, and salts (especially phosphates and sulphates); but after a few days the equilibrium is re-established and the quantity of urine and urea diminish. Pure milk diet generally becomes distasteful, and may cause dilatation of the stomach and intestines, with disappearance of the hydrochloric acid, constipation, and scybalous stools containing caseous fatty matter. These conditions, when combined, lead to emaciation and organic degeneration if the diet is too long continued. The author recommends a mixed milk diet with vegetables, boiled or roast fish, broiled meats, and game in chronic interstitial nephritis. The indications for a pure milk diet are acute nephritis and acute attacks in chronic nephritis.

ANEURISM OF THE KIDNEY.

E. Hahn ⁶⁹_{Aug. 9, '94} describes a case of a woman, aged 49 years, who, two months after a fall, had a feeling as of a lump in the abdomen, with swelling behind the false ribs on the left side. She suffered from anorexia, dyspepsia, and attacks of lumbar pain with emaciation. The urine was normal. The author made a lateral incision and reached the kidney, but the hæmorrhage was so abundant that laparotomy became necessary, the tumor and the kidney being extirpated. The patient entirely recovered. The tumor was found to be an aneurism of one of the dividing branches of the renal artery, the aneurism and the kidney being in the same sac. Hahn has only found five cases of renal aneurism recorded in literature, and calls attention to the difficulty of diagnosis.

URÆMIA.

E. Hughes and W. Carter ⁵_{Aug., '94} have made some interesting experimental researches on the pathogeny of uræmia. Injections, into dogs, of human urine from healthy persons and from those suffering from Bright's disease, of solutions of urea, creatin, and creatinin, caused a uniform lowering of temperature; injection of dogs' urine in small doses caused a fall, and in large doses a fall followed by a rise. Experiments with blood-serum gave contradictory results, but, nevertheless, showed the probable existence in uræmic blood of a poison capable of causing elevation of temperature. In other experiments the renal arteries of the dog were tied and their blood injected into other dogs, uræmia being here produced by a special poison circulating in the blood, and found in the serous effusions, as in uræmic ascites. To this poison other active secondary substances may be added, as urea, potassium, etc. It is destroyed by heat, difficult of dialysis, and probably albuminous; injected into animals it causes nephritis. The authors evolve the idea that uræmia may exist without a previous lesion of the kidney, though these are in reality cases of toxæmia rather than of uræmia. Vanni and Manzini ³¹⁹_{June 16, '94} have endeavored to verify the opinion of Brown-Séquard as to the secretion by the kidney of a substance neutralizing the toxins in the blood. Subcutaneous injections of glycerin-extract of renal substance in no way modified the results obtained in animals by nephrectomy or ligature of the ureters; on the contrary, intra-venous injections of aqueous extract of renal

substance seemed to prolong life in these two classes of animals. Herter ¹_{Apr. 22, '94} attributed to urea the most important rôle in the production of uræmia. Hanst ⁷⁶⁰_{May 12, '94} admits the possibility of nephritis and uræmia in chlorosis from disturbances of nutrition and the excretion by the kidney of incompletely oxidized products on non-assimilation. Different conditions—as renal arterial aplasia of chlorosis (Lancereaux), overfeeding, bad hygiene, hepatic insufficiency, pregnancy, etc.—may favor the development of this uræmia. Foster ¹_{Mar. 10, '94} also believes that such associated conditions are necessary to cause the appearance of uræmic convulsions in Bright's disease.

Fresson ⁷_{No. 27, '93} gives the history of a uræmic patient with 6 to 9 grammes ($1\frac{1}{2}$ to $2\frac{1}{4}$ drachms) of albumin in the urine, in whom there was a single, irregular, multilobular kidney with two ureters. Sacaze ⁹⁹⁶_{Dec. 10, '93} has collected the lectures of Grasset on Bright's disease and uræmia, apropos of such a case cured, in the early stage, by blood-letting and absolute milk diet. Marks ⁶⁵_{Apr., '94} reports a case of uræmia with unilateral convulsions in a man of 53 years. II. Basset ¹⁰⁸⁸_{June 10, '94} describes two cases of uræmic hemiplegia—the first in a patient with acute nephritis, who recovered, and the second in a man of 50 years, with Bright's disease, who died—without autopsy. Rothmann ⁴_{July 23, '94} observed sudden transitory blindness in one patient, the left eye and then the right being attacked, recurrence taking place in the left. The patient died, two months later, from phthisis. The author concludes that blindness in grave nephritis, with or without other uræmic symptoms, is peripheral in nature and due to œdema of the optic sheath. The same is true of amaurosis, which is caused by hæmorrhage. Pupillary reaction may persist, diminish, or disappear without necessarily causing us to reject the theory of peripheral compression of the optic nerve; its persistence renders the prognosis favorable and its return announces the return of vision; however, pupillary rigidity is not always a bad symptom. After recovery the nerve may become absolutely normal, or may present some degeneration at the periphery.

Cullerre ⁹⁴_{July, '94} gives the history of an alcoholic patient who had suffered from rupture of the urethra nine years previously, a progressive stricture, with difficulty of micturition, following. Mental troubles appeared suddenly, causing delirium tremens to be sus-

pected; and, after the acute attack, there was mental confusion with hypochondriacal, delirious ideas of persecution." At the time of the attack retention of urine was complete and internal urethrotomy was practiced, the patient slowly recovering his health. The author attributes to alcohol but a secondary rôle in this case, which he regards as one of uræmic intoxication. Toulouse¹⁰⁰
June 16, '94 gives a complete general review of the mental troubles observed in uræmia.

Bowes³⁶
Mar., '94 reports a case of parenchymatous nephritis with uræmic convulsions recovering rapidly under the influence of croton-oil, pilocarpine, and heat; albuminuria permanently disappeared at the end of four days.

Lindsay⁶
Aug. 25, '94 had under his care a child of 4 years, with acute nephritis, who fell into a comatose condition, soon accompanied by generalized convulsions. The usual treatment failing, he tried compression of the primary carotid artery on both sides, when the spasms disappeared, returning, however, at the end of some minutes. Compression was repeated, and was followed by a longer period of calm. It was employed a number of times, always with success, and the child recovered. Beverly Robinson⁵⁹
Mar. 17, '94 states that venesection, followed by saline transfusion, may be of service in certain cases. In the discussion of his paper, Delafield stated that, as there is always constriction of the arteries in uræmia, cure may be obtained by whatever treatment may bring about vaso-dilatation. Page¹
May 12, '94 recognizes three factors in the production of uræmia,—vicious changes in the blood, increased sensibility of the nerve-centres, and increased arterial tension. He discusses the results obtained by venesection, chloroform, opium, pilocarpine, and veratrum viride.

SYPHILIS OF THE KIDNEY.

Jaccoud¹⁴
Nov. 22, '93 describes the interesting case of a man, aged 26 years, with all the signs of acute or subacute glomerular nephritis of syphilitic origin, and appearing three months after the appearance of the chancre. In these cases antisiphilitic treatment is the true touch-stone, for milk diet is without effect. L. Lévi⁷
No. 6, '94 gives the history of a woman of 22 years, with all the symptoms of interstitial nephritis, who died in hospital from convulsive uræmia and cerebellar hæmorrhage. The kidneys were found to be small

and sclerotic, the heart hypertrophied, and the arteries showed extensive aplasia. The patient was syphilitic and presented gummata, though she denied having acquired the disease. The author is unable to say whether it was hereditary or not. R. Massalongo⁵⁰_{Apr. 13, '94} describes a case of congenital syphilis of the kidney, a fatal interstitial nephritis, which he regards as unique. The child, 8 months old, was born before term of a syphilitic mother and died in uræmic convulsions. At the autopsy diffuse periarteritis and endarteritis with interstitial nephritis was found, analogous to tertiary syphilitic nephritis. The pathogeny of the arterial lesions produced *in utero* by syphilis is as yet unknown.

TRAUMATISM OF THE KIDNEY.

Wyatt Johnson²⁸²_{Feb. 24, '94} presents two cases of rupture of the kidney, one of which was remarkable from the fact that it was a single kidney and very large. Affleck⁹⁰_{Sept., '94} describes a case in which subphrenic suppuration and urinary fistula followed injury and rupture of the kidney, the organ seeming to have resumed its functions after the injury, as the amount of urine eliminated by the fistula was equal to that eliminated by the natural passages. Mermet⁷_{No. 12, '94} reports a case of contusion of both kidneys in a patient run over by an omnibus, the perineal peritoneum being torn and internal hæmorrhage leading to death. Buscarlet¹⁹⁷_{July 20, '94} observed an enormous perinephritic phlegmon in a child of 20 months, following a fall out of bed. The author does not believe that the kidney was ruptured.

Briddon⁹⁶_{June, '94} reports three cases of rupture of the kidney in which surgical intervention was successful. The elements of diagnosis are: (1) violent injury in the lumbar region; (2) hæmaturia; (3) great sensibility in the region of the kidney, with or without tumor, as in cases of rupture of the peritoneum. As treatment he indicates, in injuries of medium intensity, absolute repose, diet, applications of ice; if symptoms of infection appear, lumbar incisions and drainage of the infected cavity; if there is rupture of the peritoneum with intra-abdominal hæmorrhage, the only resource is laparotomy.

Rein²¹⁴²_{'94} states that fissures and laceration of the kidney may be produced directly or by *contrecoup*, and heal by the formation of a dense cicatricial tissue, but never by regeneration of the renal

parenchyma. The symptoms are hæmorrhage and pain, the latter from obstruction of the ureter by a blood-clot. Suppuration is a rare complication. Treatment is variable. In light injuries it should be symptomatic and expectant; the clots of blood should be removed from the bladder, by section if necessary. In cases where the hæmaturia assumes a grave form lumbar incision or laparotomy should be performed in order to reach the spot of hæmorrhage, and, if need be, to tie the renal vessels, leaving the organ in place. If there are signs of suppuration, lumbar nephrotomy is indicated.

SOLID TUMORS.

Paul ¹⁸⁷_{Jan., '94} assigns the following characteristics to congenital sarcoma of the kidney: It appears during the first five years of life and is probably always congenital. It is primarily extra-renal, usually subcapsular, surrounding or distending the kidney rather than infiltrating it. It is bilateral in half the cases and gives rise to few urinary symptoms, death occurring most frequently through prostration or neighboring compression. Metastasis is not frequent, but the tumor recurs if removed. The term "sarcoma" is not absolutely correct as applied to these cases, because they contain adult fibrous tissue, yellow elastic tissue, fat, striated muscular tissue, and renal embryonal tissue. K. Brandt ⁹⁹⁶_{Feb. 25, '94} practiced nephrectomy in the case of a boy, 13 months old, for sarcoma of the left kidney, the child apparently recovering; but Schibbye reports ⁹⁹⁶_{May 10, '94} later on that the child who was operated on in August remained well until the middle of January, when he died from infiltration of the entire right lung by a neoplasm. Hawthorne ²¹³_{Feb., '94} showed, at a meeting of the Glasgow Pathological Society, a specimen of carcinomatous growth of the left kidney and abdominal lymphatic glands, removed post-mortem from a woman aged 30 years. Bernard ⁵_{May, '94} reports the case of a rheumatic atheromatous patient who for seven years had a tumor in the right side of the abdomen. There had been two attacks of hæmaturia within six months, but no subsequent hæmorrhage; vomiting persisted until three months before death, and during these three months a perinephritis developed. Autopsy revealed an encephaloid tumor, the adrenals not being involved. Krüger reports ²¹_{Mar. 10, '94} two cases of carcinoma in children aged $2\frac{1}{2}$ and $4\frac{1}{2}$

years, respectively; Kieseritzky, ²¹_{Mar. 24, '94} one in a child 2½ years old; and Osler, ¹_{July 28, '94} two cases in children,—one 10 years old, an exceptional occurrence. Bland Sutton ¹⁰⁷⁷_{Nov., '93} discusses the signs which aid in diagnosing the various tumors of the kidney and the value of extirpation. In the child removal of sarcoma is absolutely useless; in the adult nephrectomy may be indicated to cause the disappearance of pain, tumors which spring from the suprarenal capsules appearing to give the most encouraging results.

The question as to the relation of renal tumors to the presence under the capsule of the kidney of small aberrant suprarenal capsules has given rise to numerous articles. As is known, Grawitz was the first to formulate the opinion that certain tumors of the kidney were formed from what he calls “strumæ suprarenales aberratæ.” C. Norman ¹⁶_{Oct. 2, '93} does not accept this theory as far as regards adenoma, but, like Sabourin, he believes these to originate from the cells of the convoluted tubules. Sudeck ⁶⁹_{June 21, '94} especially combats the theory of Grawitz, showing that renal adenoma is not rare in small, contracted kidney; that the formation of papillæ is but apparent, and that the production of cysts covered with epithelium is not very well explained by the suprarenal capsule. Askanazy, ⁶⁹_{June 21, '94} however, remarks that some light is afforded by the medullary processes of the normal suprarenal capsule, that Marchand and Ambrosius have described a true glandular canal in an adenoma of the cortical layer of a capsule, and that the cysts may be produced from these canals. Jores, ⁶⁹_{Mar. 1, '94} in a study of two cases of suprarenal sarcoma, expresses himself as agreeing with the views of Grawitz, Beneke, and others. One of the most important articles on the subject is that of Lubarsch, ¹³_{Mar. 16, '94} who takes up all the arguments of Grawitz in a study based on nine cases. These arguments are: the frequent presence of small fragments of aberrant suprarenal capsule on the surface of the kidney (9.2 per cent. of cadavers); the encysting of tumors which lie beneath the capsule of the kidney and separated from the tissue; their nodular form, their color, and their consistency, which resembles that of the cortical layer of the capsules; their tendency to the formation of cysts, to necrosis, and to hæmorrhage. Lubarsch adds to these the presence of glycogen in the tumor, to which he attaches great importance, as showing a relation between

the tumor and embryonic tissue. He has, besides, demonstrated the presence of glycogen in the suprarenal capsules of rabbits and guinea-pigs. The presence of glycogen had already been pointed out by Askanazy and by Hildebrand, ⁴¹ Aug. 20, '94 the latter of whom also admits the relation between the suprarenal capsules and renal tumors; but, from a study of three cases, he believes that not only adenomata and sarcomata, but also endotheliomata are developed from the capsules. Birch-Hirschfeld ¹³ May 15, '94 examined a tumor removed by Döderlein from the renal region in a girl of 7 years, and found glandular, sarcomatous, and myxomatous tissue, and smooth, muscular fibre. He believes that the tumor developed from the Wolffian body, an opinion confirmed by Hanseemann. ⁴ July 20, '94

CYSTS OF THE KIDNEY.

Bouchacourt ⁷ No. 19, '93 reports the case of a woman, aged 48 years, who died in the service of Hayem with symptoms of cerebro-respiratory uræmia. At the autopsy cysts were found in the kidney and liver. The latter organ was small, weighing 1170 grammes ($37\frac{1}{2}$ ounces), and was covered with a number of little brown spots with a white areola. These, on section, proved to be small cysts, the largest being the size of a cherry. The kidneys, surrounded by considerable fat, were voluminous, the left weighing 440 grammes ($14\frac{1}{4}$ ounces) and the right 400 grammes ($12\frac{3}{4}$ ounces). The entire parenchyma was dotted with an infinite number of cysts containing a liquid apparently composed of urine, very dark and not hæmorrhagic. J. Lloyd ³² Dec., '93 describes a cystic kidney as large as an adult head removed from a man of 35 years. The origin seemed to date back nine years, to a severe blow on the abdomen. Flexner ⁷⁶⁴ Nov., '93 presented specimens of polycystic kidney not diagnosed during life, and McIntyre ⁹⁹ Aug. 23, '94 a case in which one of the kidneys weighed more than eight pounds and the other less than a pound. Ferron and Binaud ¹⁸⁸ May 20, '94 also presented specimens of two enormous kidneys, the left being thirty-three centimetres long and forty-eight in circumference. Diagnosis had been made during life, and the patient died suddenly.

Ritchie ⁵⁶ Jan., '94 reports an interesting case in which the two kidneys, very voluminous, differed from ordinary polycystic kidneys in that they were much firmer and that the contents of the cysts were solid or nearly so, few of them containing fluid. The

patient had suffered for several years; three years previously a tumor appeared which caused marked compression of the vena cava, leading to extensive varices of the limbs and scrotum and compensatory dilatation of the veins and abdomen. Pus was found in the urine, and toward the end as much as 12 per cent. of albumin. During the last year of life there was a notable decrease in the size of the tumor and the symptoms of compression, probably because some of the cysts had emptied into the ureter. At the time that the patient presented uræmic symptoms he passed 73 ounces (2280 grammes) of urine in twenty-four hours, of a specific gravity of 1016, and containing as much as 293 grains (19.4 grammes) of urea.

Mayzel²⁶_{July 2, '94} communicates the following interesting case: A healthy married lady of 25 years, mother of two children, began to experience occasionally, some obscure pain about the sacrum, and later on in the lumbar region, corresponding to the site of the kidney. A few months after the appearance of the tumor she suddenly, and without apparent cause, felt a slight diffuse sacral pain and voided about $\frac{1}{2}$ litre (1 pint) of exceedingly turbid urine, the act of micturition being accompanied by straining. On examination the urine was found to contain an hydatid cyst the size of a large hen's egg, and several scores of smaller cysts showing the presence of scolices and Charcot's crystals. It had an acid reaction and contained crystals as well as hooklets, a few leucocytes, etc. The urine now gradually cleared and about the fourth day ceased to show any trace of disintegrated echinococci. The general health of the patient remained perfectly good throughout.

TUBERCULOSIS OF THE KIDNEY.

A. Borrel²⁶²_{Feb., '94} has studied experimental tuberculosis of the kidney. If cultures be injected into the vein of the rabbit's ear, the majority of the bacilli are arrested in the lung. To produce renal tuberculosis, cultures were injected into the aorta itself by way of the primary carotid. The author concludes that there are two distinct forms of renal tuberculosis, differing less in their structure than in their origin. In cases of direct inoculation into the arterial system the tuberculosis begins immediately after inoculation. The bacilli are enveloped in epithelial cells with abundant protoplasm and large nuclei, but without much chromatin, these

going to form masses surrounded by smaller cells with less protoplasm and with nuclei rich in chromatin. These masses are strictly interstitial, the renal epithelium remaining free and undergoing changes in nutrition only secondarily; they are localized in the glandular and cortical substance. Borrel gives to this form the name of primary renal tuberculosis.

In the second form, which commences about twenty days after interstitial inoculation and the formation of a distinct caseous nucleus, and which the author calls granular tuberculosis of the kidney, invasion takes place through the lymphatics. There is more precise localization, the tubercles occupying the medullary and cortical substance. Here also, however, the process remains interstitial, the epithelium not being at all involved. These results differ altogether from the opinion of Baumgarten upon the participation of the fixed cells and renal epithelium, and confirms the views of Virchow and Metschnikoff, that tubercle is an accumulation of lymphatic cells, and that lymphatic granulation is identical in all organs.

De Massary⁷_{No.26, '93} reports the case of a tuberculous patient with purulent urine, who, six weeks before death, observed that urine escaped through the anus. Palpation revealed a deep ulceration and depression from three to four centimetres above the anus. The patient sometimes urinated through the urethra, sometimes through the rectum. At the autopsy the kidney and ureter were found to be transformed into an immense pouch, completely closed, and the ureter was obliterated one or two centimetres above the bladder. The left kidney presented caseous granulations and the bladder tubercular cystitis. The prostate was entirely destroyed, and the cavity which replaced it had a wide communication with the rectum on one side and with the lower part of the ureter on the other. The author does not express an opinion as to whether the process was ascending or descending.

Chavannaz¹⁸⁸_{No.12, '93} gives the history of a patient who died in coma from hæmorrhage of the pons, and in whom at autopsy the right kidney was found to contain six cavities, the size of hazelnuts, containing tubercular pus. A child, observed by Miles,¹⁶_{July, '94} died suddenly four days after entrance to hospital, having complained only of pain above the pubis and incontinence of urine. The latter contained pus, and fever had been suspected. The two

kidneys were found to be in an advanced state of tuberculous degeneration.

Cadwallader⁷⁷_{Apr., '94} insists that vesical pain and tenesmus may be reliable signs of pyonephrosis, even when nothing can be discovered on the part of the kidneys. Osler,¹_{July 28, '94} as an aid in the differential diagnosis of pyelonephritis and tuberculous cystitis, states that the urine remains acid in renal tuberculosis unless there is an extensive co-existent cystitis. According to du Pasquier,²⁰³¹_{'94} tuberculosis may invade the kidney through the blood or the ureters. In the first case it is limited to the cortical layer; in the second the tubercles develop at the apex of the pyramids and become generalized throughout the organ. To these two modes of infection correspond the two types of tuberculous kidney,—medical and surgical.

Duret,²²⁰_{June, '94} from an anatomical point of view, distinguishes the miliary (medical) form, the cavernous form with numerous cavities, the cavernous form with a single cavity or pouch, and the cavernous form with pyelonephrosis. To these should be added the complicating forms, perinephritic abscess, adiposclerosis of the capsule, and fistula, or the fungous form. Before undertaking operation it must be ascertained that the kidney is the diseased organ, that it is the only diseased organ, and that the kidney on the other side is healthy. On this point many authors—notably Guyon,¹¹_{June 10, '94} who performed nephrotomy to cause the disappearance of hectic symptoms—agree that catheterism of the ureters may be of great service.

CALCULUS OF THE KIDNEY.

Navarro⁷_{No. 25, '93} presented to the Paris Anatomical Society several kidneys containing calculi, produced in dogs by adding for a month 4 grammes (1 drachm) of oxamide daily to the food. Several of the animals thus treated were killed twenty days after the suspension of the experiment, proving the persistence of the calculi, one of which had determined hydronephrosis. Moscheles observes³¹⁹_{July 7, '94} that renal calculi are composed of uric acid or urates, of phosphates, or, more rarely, of oxalates, but that the presence of one of these salts does not completely exclude the presence of others,—as, for example, when the calculus has several layers. It is, therefore, not without interest to distinguish one from the other.

If one part of the calculus is treated by hydrochloric acid and gas be suddenly set free, the presence of carbonates is probable and is confirmed by ammoniacal solution of barium hydrate. Another fragment being reduced to ashes on platinum foil, if the ashes are abundant there are probably phosphates present; dissolved in nitric acid and treated by molybdate of ammonium, the residues will give a phosphoric-acid reaction. To separate the uric and oxalic acids from the phosphoric a piece of the calculus is placed for ten minutes in a fairly-concentrated sodium solution, this being better than hydrochloric acid. It is filtered to remove the carbonates, ferric oxide (if there be any), organic *débris*, etc., evaporated in a water-bath, and treated cold with dilute hydrochloric acid. If a residue remain it is uric acid, as will be proved by the nitrate-of-ammonia test. If the solution contain only phosphates and oxalates it is evaporated and spread by diluted acetic acid, when, by adding acetate of lime, the oxalate of lime will be precipitated and the phosphate of lime will remain in solution.

Southworth⁵⁹_{Sept. 8, '94} presented to the New York Pathological Society the kidney from a newborn child containing not the fine dust of uric acid and the urates, but veritable masses. He questions whether the elimination of these masses by the ureter may not play some rôle in the fits of crying and the colic of newborn children.

G. Sharp²⁷⁷_{July, '94} attended a woman of 45 in two attacks of renal colic, who on both occasions passed in the urine a dozen calculi weighing something like 2 to 6 grains (0.13 to 0.39 gramme). Their most peculiar feature was their color,—a beautiful puce. One could hardly believe this to be due to iron, though such was the case. The iron did not give the reaction with ammonium sulphide, and was only detected after a small quantity had been fused on a piece of platinum foil with a drop of strong nitric acid, to which afterward a drop of dilute hydrochloric acid and a drop of ferrocyanide of potassium were added, when the characteristic blue color was obtained. The calculus was also soluble in strong sulphuric acid and formed a red-violet solution; strong nitric acid formed a reddish-yellow solution, slowly passing to yellow. These also pointed to the presence of iron.

Forbes⁹_{Aug. 18, '94} in making an autopsy, found the lesser pelvis and one of the calices of the kidney filled with a large calculus

weighing 147 grains (9.7 grammes), nineteen-thirty-seconds as thick as the thumb, and one and one-eighth to one and one-half thumbs in width. Closer examination and chemical tests showed that the calculus was one of the rare kind containing only indigo. Tuffier³_{Dec.15,'93} insists on a general recognition of the fact that the syndrome of renal colic may be observed apart from the presence of calculi, in various lesions of the kidney. Thus, attacks of pseudorenal colic occur: (1) in connection with pyelonephritis, intermittent hydronephrosis, temporary obstruction of the ureters by hydatids or blood-clots; (2) in affections in which there is no apparent evidence of urethral obstruction, as in renal tuberculosis and slight degrees of movable kidney. It seems very probable that vascular troubles or attacks of renal congestion have something to do with the production of pseudorenal colic.

E. Reymond⁷_{No.12,'94} reports a case of calculous pyelonephritis complicated by perinephritic phlegmon, perityphlitis, and obstruction of the ureter by a calculus the nature of which is not indicated. H. Claude⁷_{No.12,'94} describes a case of renal lithiasis causing right hydronephrosis. Laparotomy having demonstrated the right kidney to be much dilated, irregular, and manifestly containing calculi, the organ was removed and the patient succumbed. Post-mortem examination showed that the left ureter was obliterated, and the kidney on that side completely atrophied. Orillard⁷_{No.7,'94} also reports an interesting case of polycystic kidneys with renal lithiasis and left hydronephrosis, a large calculus blocking the ureter on the same side. There was, besides, a perinephritic abscess.

Treatment.—Oussilloux⁸⁰_{Mar.15,'94} recommends olive-oil, in doses of 150 to 400 grammes ($4\frac{3}{4}$ to $12\frac{3}{4}$ ounces), in the treatment of nephritic colic, and reports two cases in which its use was attended with excellent results. McKinlock¹_{Aug.18,'94} used piperazine in four cases, in large doses,— $3\frac{1}{4}$ drachms (13 grammes) in twenty-four hours. Harrison¹⁰⁷⁷_{Dec.6,'93} after insisting upon the physical condition of the formation of renal and vesical calculi, recommends dietetic treatment and borocitrate of magnesia. Liebe³⁴_{Aug.14,'94} strongly urges the mechanical treatment of renal calculi, and reports the case of his father, also a physician, who suffered for years from nephritic colic, passing seventy-six stones from 1875 to 1885. In all the attacks a single remedy, that of movement, succeeded in causing

the passage of the calculus, particular relief being afforded by a railroad or carriage journey, the shaking motion hastening the passage of the stone through the bladder. The author notes an apparatus designed by Nägl, of Carlsbad, which seems to him destined to be of great service in the mechanical treatment of calculi. The most important work upon the treatment of uric-acid concretions is that of Lépine.⁴⁰
May, '94 Uric acid is certainly less oxidized than urea, but that fact does not prove that its production is due to a diminished oxidation of nitrogenous materials. It seems probable, on the contrary, especially from the researches of Horbaczewski and his pupils, that uric acid comes from the normal tissues and the nuclein which they contain, especially the white cells. Hence, from a dietetic stand-point, if a meat diet cannot be recommended it is at least not responsible for all the bad effects hitherto attributed to it; and, besides, it would be imprudent to substitute for it a vegetarian diet, which does not diminish the quantity of uric acid, but lessens its solubility. The question of the solubility of uric acid is very interesting, and the researches of Posner have shown that the uric acid in the urine of patients treated with weak alkaline waters was liable to pass through Pfeiffer's filter, whereas that in the urine of gouty patients remained behind,—a fact which supports the scientific practice of to-day. An excess of alkalines is always injurious. The author reviews the various methods recently proposed, such as Mendelsohn's powder, glycerin, and piperazine. He is not disinclined to think that the latter agent may have a preventive action, but he does not believe in its curative properties.

MOVABLE KIDNEY.

Baxter Tyrie⁹⁰
Sept., '94 publishes two cases in which the kidneys, instead of having their normal form, were rectangular, and deviated in such a way that the lesser pelvis was on the anterior surface. In such a case there are always arterial anomalies, to which the author attributes a certain influence in the displacement of the kidney. He, moreover, distinguishes between movable and floating kidney, and is disposed to admit that the former is most frequently congenital. Litten⁴¹
Aug. 6, '94 states that the kidney is movable during respiration to the same degree as the liver and the spleen. Legendre¹⁷
Dec. 28, '93 examined a number of children in a

large clinic and found only once a prolapse of the liver.—in a girl of 14 years suffering from dilatation of the stomach and from tight-lacing. The pathogeny appears to him to be complex, and he advances the following propositions as to the etiological factors: 1. Nephroptosis exists nearly always in women. 2. It is exceptional in the child. 3. It does not appear in girls until the period of adolescence. 4. It is most frequent in women who have been pregnant. 5. It frequently coincides with dyspepsia, dilatation of the stomach, gastro-intestinal atony, and hepatomegalia. 6. It is often associated with flaccidity of the intestinal walls. He believes that some influence is exerted by constriction at the base of the thorax by the corset, and he recommends special corsets, not causing such constriction, for young and nervous girls with gastro-intestinal atony. Verhoogen and Godard,¹⁵⁴_{Mar.1,'94} in 66 women examined in a clinic for digestive diseases, found 28 with the right kidney movable, and in 4 of these the left kidney also. In only 14 was enteroptosis really present. The authors believe the proportion (43 per cent.) too great, owing to the class of cases in which their researches were made. Mathieu¹¹_{Dec.10,'93} presents more extensive statistics. Of 306 women treated in hospital he found movable kidney 85 times, or 25 per cent.; and of 46 women treated for dyspeptic troubles, 32 times, or 66 per cent. Nephroptosis is limited in half the cases to a displacement by which but half the organ is felt. The influence of pregnancy is certain, but not excessive.

Osler¹_{July 21,'94} alludes to the difficulty of diagnosis of movable kidney and attributes the attacks of pain described by Dietl to closure of the ureter, consecutive hydronephrosis, and distension of the renal tissue. Courtin⁷⁰_{Dec.24,'93} offers the theory of inflammation of the lesser pelvis, with catarrh and nephritic colic. Studdiford reports¹_{May 19,'94} a case in an ataxic woman, and S. Ayres²³¹_{Oct.,'93} gives a good *résumé* of the question, placing special stress on the nervous symptoms.

Wetherell¹¹²_{Sept.,'94} recommends complete rest in bed and forced feeding before surgical treatment, with a view of restoring the adipose capsule of the kidney. Segond and Walther¹⁴_{July 18,'94} report a case in which nephrorrhaphy had been performed in 1889, the patient again suffering in the region of the kidney after a fall. A second operation showed the kidney fixed in its lower half and

anteflexed in its upper half. Heminephrorrhaphy was followed by recovery. Segond adds that he has performed six nephrorrhaphies with sufficiently good results, but that the indications for the operation are limited and that hereafter he will advise the wearing of a belt. Reed, ²³³_{Apr., '94} on the other hand, proposes to practice fixation of the kidney at an early date in such cases.

HYDRONEPHROSIS.

Tuffier ³_{Dec. 1, '93} produced hydronephrosis in the dog, four out of eight times, simply by separating the kidney from its attachments. The ureter bends upon itself about four-fifths of a thumb's length below the hilus, simple curvature at first resulting, sufficient to cause increased pressure on the kidney and to diminish the excretion of urine. When the lesser pelvis becomes distended a veritable closure takes place. Navarro ⁷_{Nov. 24, '94} also observed hydronephrosis following experimental renal ectopia.

N. Pitt ²_{Apr. 21, '94} considers aberrant renal vessels as a cause of hydronephrosis, as seen in four cases by him. In two of these veins and in the other two arterial branches were the aberrant vessels. His opinion was opposed in the discussion by Targett and Turner. P. Wagner ¹³_{Apr., '94} gives the history of a child of 10 years, who, after a blow on the abdomen, in the region of the right kidney, urinated blood for five days, developing hydronephrosis in three weeks, necessitating nephrotomy. Traumatic hydronephrosis, according to this author, may be due (1) to serious injury, with rupture and consecutive stricture of the ureter; (2) to an extravasation of blood about the kidney and ureter; (3) to a blood-clot obstructing the ureter; (4) to displacement by the traumatism of a calculus, which lodges in the ureter; (5) to displacement of the kidney and closure of the ureter.

Martin ²⁸²_{Feb., '94} reports a case in which the cause of an hydronephrosis was a fibrous perivesical thickening at the point where the ureter enters the trigone. The left testicle had been castrated for a cause not stated by the author. C. Norman ¹⁶_{Nov., '93} describes a case in which the internal surface of the sac and the ureter presented a peculiar rugous aspect, due to numerous small lines cutting through each other in all directions. Albarran ³_{Jan. 27, '94} contests the current opinion that closed hydronephrosis always passes through an open stage. Aseptic ligature of the ureter does indeed deter-

mine atrophy of the kidney, as shown by Straus and Surmont, but it is preceded by stasis and dilatation of the excretory canals. Ligature first increases pressure, which may rise at the end of four hours to seventy-five millimetres of mercury and be accompanied by renal congestion and even hæmorrhage and œdema of the parenchyma; the quantity of urine diminishes and the proportion of urea falls. Glomerular and interstitial lesions occur later on, diminishing greatly the value of the kidney as a purifier of the organism. In one case of closed hydronephrosis for which Guyon had performed nephrotomy, the author had observed that the urine secreted by the fistula contained only 2.65 grammes (40 grains) of urea per litre (quart), or 0.56 gramme ($8\frac{1}{2}$ grains) per 210 cubic centimetres ($6\frac{3}{4}$ fluidounces) in twenty-four hours, while the healthy kidney secreted 1230 cubic centimetres (39 fluidounces) of urine containing 24 grammes ($6\frac{1}{4}$ drachms) of urea per litre. Duplay¹⁷_{July 11, '94} publishes a case of intermittent hydronephrosis, due to movable kidney, for which he practiced nephropexy. Annequin,³¹_{Feb. 3, '94} apropos of a case observed by him, makes some interesting remarks on the pathogeny of intermittent hydronephrosis.

PYELITIS AND PYELONEPHRITIS.

Maxson⁸¹⁴_{Feb. 19, '94} reports three interesting cases at first mistaken for Bright's disease, and insists upon the predisposing rôle, in these affections, of ice-cream and iced drinks when taken in immoderate quantities. Melvin's case¹⁰⁹⁹_{Feb., '94} is remarkable in that the patient complained simply of a slight pain in the penis. He refused appropriate treatment and succumbed to double pyelonephritis. In the case reported by Guépin,⁵⁵_{Aug. 11, '94} the predominant symptom was vesical irritation and a constant desire to urinate, which led to the suspicion of cystitis; such irritation of the bladder by renal disease has, however, long been known. Enlargement of the meatus for the purpose of washing out the bladder led to the spontaneous evacuation of the renal pus. The patient was relieved, but ultimately died with symptoms of infection.

Savor⁴¹_{Aug. 9, '94} examined, from an etiological stand-point, 17 cases of pyelonephritis with cystitis, 1 case of cystopyelitis without nephritis, and 1 case of croupous cystopyelitis. Of these 19 cases he found in 13 a bacillus not liquefying gelatin,—ten times in pure culture and three times associated with a liquefying bacillus; the

latter was found four times in pure culture. The cases of cystopyelitis were due to a pyogenic streptococcus. The non-liquefying bacillus was the coli and the liquefying bacillus the proteus Hauser. In the great majority of cases the infection was primarily vesical; in some cases it was due to descending nephritis. Sternberg⁵_{June, '94} concludes that pyelonephritis and cystitis are most frequently caused by micro-organisms introduced into the bladder, most frequently by the catheter, rendered irritable by traumatism or chemical action. The most common micro-organism is the coli bacillus, which may be found on the prepuce or the vulva, but which the researches of Lustgarten, Mannaberg, and Krögus have shown not to exist in the normal urethra.

Edington²¹³_{Aug., '94} describes the case of a child of 5 years who, from the age of 18 months, complained of pain about the glans during micturition, frequently abstained from passing urine for an entire day, and sometimes passed it involuntarily. He died of pyelonephritis several days after a catheter had been used, and at the autopsy hypertrophy of the bladder was found, with cystitis, dilatation of the ureters and lesser pelves, and suppurative nephritis. Faucher⁹⁹⁶_{Sept. 10, '94} indicates the medical treatment to be followed in acute primary or secondary pyelitis as well as the chronic form, though most of the measures employed do not bring about recovery, and surgical measures are frequently necessary. Weber³_{No. 72, '93} recommends large doses of creasote in pyelonephritis, having observed notable improvement after its use in four cases. Redmon³⁶⁴_{July 16, '94} reports two interesting cases of perineal abscess cured by incision.

CYSTITIS.

Huber²¹⁴_{Oct. 1, '93} examined six cases of cystitis, finding the streptococcus pyogenes once and bacilli belonging to the coli commune group five times. The latter were pathogenic for mice, guinea-pigs, and rabbits. In one case the urine was examined ten times and the bacillus found in a pure culture each time. It is to be noted that these bacilli do not require decomposition of the urine to produce cystitis, as the urine remains acid. Wreden¹¹⁰¹_{V. 2, No. 5} examined twenty-one cases, finding micro-organisms in all but one, that being a case of tumor of the bladder. Ten varieties were noted,—the bacillus coli, proteus, fluorescent non-liquefying,

staphylococcus aureus, streptococcus pyogenes, micrococcus ureæ flavus pyogenes, staphylococcus ureæ liquefaciens, diplococcus ureæ non-pyogenes, micrococcus aërogenes, and gonococcus. He combats some of the ideas expressed by Rovsing, especially his theory that the microbes first cause decomposition of the urine, and that the ammonia thus formed irritates the mucous membrane and prepares the soil for the multiplication of bacilli. Were this true the urine should always be ammoniacal; whereas, cases of cystitis with acid reaction of the urine are much more common than those with an alkaline reaction. Further, the injection into the bladder of sterilized urine, containing considerable ammonia, does not determine cystitis, and, if Rovsing were able to cause it by injecting urine decomposed by a microbe and filtered, he must at the same time with the ammonia have introduced soluble products of this microbe injurious to the vesical epithelium. Wreden also shows that the microbes are not always introduced by the catheter, and that they cause cystitis in other ways, as by passage through the kidney. He also admits that they may pass directly from the rectum into the bladder in cases of prolonged constipation, acute or chronic inflammation or tumors of the rectum, prostatic lesions, or internal hæmorrhoids. To confirm this fact he instituted experiments on rabbits. Having assured himself that the urine was free from micro-organisms, he produced lesions of the rectum by the injection of very hot water or croton-oil, or by irritation of mucous membrane somewhat high up by means of a platinum hook. Cystitis followed and the microbes of the intestine appeared in the urine. If a tampon containing the proteus or the bacillus mesentericus vulgaris were introduced into the rectum after the latter had been irritated, these bacilli passed into the bladder. Posner and Lewin⁴_{Aug. 6, '04} admit this explanation of Wreden for a certain number of cases of cystitis and pyelonephritis of the so-called cryptogenetic form. They succeeded in provoking cystitis in rabbits by occluding the anus, thus arresting the fecal matter, after ligation of the urethra; the latter operation alone and aseptically did not provoke cystitis. In a certain number of cases they noted peritonitis between the bladder and the distended rectum, explaining the passage of micro-organisms; but when peritonitis was not present, the bacteria were probably taken up by the blood and caused cystitis after elimination by the kidney.

From a clinical stand-point; cystitis from descending infection is denied by Guyon and affirmed by various authors, notably Bazy. Jacobson ⁷³_{May 12, '94} reports a case confirming Bazy's opinion.

Glenn ⁸⁶_{Oct., '93} divides cystitis into three varieties: (1) superficial, affecting the mucous membrane lining the bladder; (2) interstitial inflammation, involving mucous membrane, connective and muscular tissue; (3) productive, which includes the lesions of tubercle, ulcerations, fungo-vascular excrescences, etc. Morrison, ⁴³⁰_{Dec., '93} Curtis, ⁸⁰¹_{Feb. 10, '94} and Robbins ¹⁸⁵_{Feb., '94} discuss the general character and plans of treatment. Hurt ²⁰⁷_{Feb., '94} reports the interesting case of a woman with cystitis, in whom examination showed two strictures caused by deep ulcers. She was cured by nitrate of silver. Casper ³⁹⁹_{Feb. 10, '94} discusses cystitis of the neck of gonorrhœal origin, especially from a clinical stand-point, and gives three cases of the acute, subacute, and chronic forms. He recommends washing out the bladder with solutions of nitrate of silver, 1 to 1000 or 1 to 500, and instillation of the same substance in $\frac{1}{2}$ - to 2-per-cent. doses.

Block ⁸⁰¹_{Nov., '93} discusses hæmorrhages of the bladder, which are painless, irregular, recurring at first at long intervals, and finally becoming constant. Pain only occurs in the later stage, and then as a sign of concomitant cystitis. G. Collin ²⁰³¹_{'94} devotes a thesis to the method followed by Guyon, based on thirty-four cases. Instillations of silver nitrate, being painful and not always curative, especially in tuberculous cystitis, are replaced by sublimate; but solutions stronger than 1 to 4000 are badly borne at first, and the instillations, made every two days, should gradually be increased from 1 to 4000 to 1 to 500. They cause rapid diminution of pain in the gonorrhœal and tuberculous forms. The quantity injected into the bladder should be from 5 to 10 grammes ($1\frac{1}{4}$ to $2\frac{1}{2}$ fluidrachms), and into the posterior urethra from 10 to 15 drops. The sublimate should not be dissolved in alcohol, which is irritating, but in tartaric-acid solution. The same method is discussed in detail by Barbier. ¹⁰⁸_{Apr. 5, '94}

Blom, ⁶⁹_{No. 35, '93} in cases of cystitis, especially of gonorrhœal origin, injects every second or third day from 1 to 6 grammes ($15\frac{1}{2}$ minims to $1\frac{1}{2}$ fluidrachms) of a solution of 1 part of iodoform in 7 parts each of ether and olive-oil. The pain and tenesmus cease at once. Hardy ¹⁸⁶_{Feb., '94} recommends irrigation of the bladder with 2

fluidounces (62 cubic centimetres) of a 25-per-cent. solution of hydrogen peroxide.

BACTERIOLOGY AND FERMENTATION OF URINE.

Hofmeister ¹²⁶_{Apr.1,'94} states that there are always large numbers of bacteria in the urine of healthy subjects and that bacteriological examination is of no value unless known pathogenic bacteria can be demonstrated. Even the staphylococcus may be found in the healthy urethra. Krogius ³_{May 23,'94} describes, under the name of "bacteriuria," eight cases of urinary infection not corresponding to cystitis and characterized by the emission of urine containing a great number of bacteria, without any inflammation of the urinary passages or infectious nephritis. The urine was slightly clouded, opalescent, scintillating as though a fine powder were suspended in it, and, when fresh, gave out a fetid and nauseating odor. It did not clear or deposit sediment on standing, the reaction was acid, and there was no albumin. Under the microscope a few rare globules of pus and an enormous number of bacteria were found, the coli bacillus existing in a pure culture. Of the eight cases only two showed slight vesical disturbance, and general symptoms were also absent, while the bacteriuria was often unnoticed. From the fact that his patients had had complicated blennorrhagia, Krogius believes that the coli bacillus had penetrated from the rectum into the bladder through the inflamed organs, as through prostatic abscess, salpingitis, and metritis. Peyer ⁷⁶⁰_{Apr.7,'94} states that the odor of the urine in bacteriuria is absolutely pathognomonic, while the opacity is permanent and does not disappear upon filtration.

Heyse, ¹¹⁴_{B.24,'93} after an interesting review of pneumaturia, records a case of gas-formation in the bladder of a patient suffering from myelitis with retention of urine. After catheterization had been practiced for some time gas was noticed escaping through the catheter. Autopsy showed gas in considerable quantities in the bladder, ureter, and substance of the kidneys. Cultures revealed the presence of a short bacillus resembling the bacterium lactis aërogenes of Escherich. Introduced under the skin, into the joints and pleural and peritoneal cavities, and in cultures, its growth was always accompanied by the formation of gas. Schnitzler ⁵⁷_{Feb.25,'94} reports an analogous case in a woman of 46 years, the

only difference being that the catheter had never been used. Here, also, the formation of gas was due to the presence of the bacillus lactis aërogenes. The author states that he had previously tried to induce pneumaturia in animals by the injection of a coli bacillus which caused abundant formation of gas in cultures. He did not succeed except in cases in which he had first rendered the animals diabetic by phloridzin. In the same way the injection of the bacillus lactis aërogenes produced a violent cystitis, but developed gas only in animals rendered diabetic.

IRRITABILITY OF THE BLADDER.

The causes of too frequent micturition in women are studied by E. Hermann,¹⁰⁷⁷
Dec. 27, '93 who places in a first category cases in which there is no local lesion, as in pregnancy; certain affections of the nervous system, as locomotor ataxy; enuresis; congenital smallness of the bladder, or hyperdistension at some time. A second class comprises all the affections of the genital tract, from simple relaxation of the perineum in child-bearing women to diseases of the appendages. After these come lesions of the urethra, especially stricture; and finally an irritable bladder, or, rather, an irritated bladder, may be the sign of a lesion of the bladder itself or of the kidney. Rigdon¹⁴⁷
July, '94 states that frequent micturition should be distinguished from painful micturition, although the origin may be the same. The causes are: (*a*) irritability of the mucous membrane by inflammation, neuralgia, or medicaments; (*b*) abnormal irritability of the vesical contents through hyperacidity, pus, blood, calculi, foreign bodies; (*c*) increase of urinary secretion; (*d*) diminution of vesical capacity; (*e*) excitation of the vesical centre; (*f*) reflex actions; (*g*) mental emotions, such as fear, anger; (*h*) paresis of the vesical sphincter, of local or central origin. Rankin²³³
Aug. 21, '94 publishes a short article on the same subject. In many cases Zuckerkandl³
May 23, '94 has found hyperæmia of the fundus of the bladder and of the upper part of the urethra, depending on congestion of the genital organs, from menstruation, coitus, pregnancy, uterine myoma, etc. Hence, treatment of the condition in women must be carried out with a view to such alterations in the genital organs. A. Johnson²³³
Sept., '93 reports two cases in which vesical irritability succeeded cystitis and was accompanied by considerable diminution in the size of the bladder.

ENURESIS.

Rachford ⁵¹_{Nov., '93} believes that incontinence of urine in children is a true neurosis and not, as a rule, due to muscular incompetency of the sphincter vesicæ. It rests upon the following important etiological factors: (1) excitability of the nerve-centres produced by heredity and age; (2) anæmia with consequent malnutrition, increasing the excitability of the nerve-centres; (3) reflex irritation. Carpenter ¹¹⁹_{Oct., '93} recognizes three varieties,—nocturna, diurna, and continua,—with numerous causes: debility of the neck of the bladder and of the internal sphincter; insufficient innervation from diseases of the spinal cord and of the nerve-centres; reflex irritation; masturbation; an overdistension of the bladder with urine; changes in the constitution of the urine. Otto ²¹_{Sept. 30, '93} reports a case of nocturnal enuresis in which the patient could only breathe through the mouth. Improvement followed nasal treatment. S. Freud ⁷⁵_{Nov. 21, '93} calls attention to a symptom existing in half the cases. If the child be seated on a table and an effort made to separate the limbs by seizing the feet, considerable unexpected resistance will be met with, which yields little by little. There is, therefore, a spasm of the adductors and also the extensors of the thigh. The fact is difficult of explanation, as there is no other sign to lead one to suspect a spastic paralysis. Rohde ¹²⁶_{July 15, '94} has found in the urine in cases of enuresis and in women suffering from frequent micturition, a substance incompletely reducing oxide of copper and giving a gray, yellowish, or greenish sediment. This substance might possibly provoke by reflex the desire to urinate. Bendersky ¹²⁶_{July 15, '94} believes this substance to be uroptyalin, which he has found in polyuria and which has been noted in diabetes.

Le Gendre and Broca ¹¹⁸_{Feb., '94} give a complete and interesting review of the treatment of enuresis. MacAlister ¹⁵_{May, '94} recommends atropine and says that the secret of success in rebellious cases lies in courageous overdosing. Satterwhite ²²⁴_{June 30, '94} is of the same opinion and gives to a child 9 years of age progressive doses up to $\frac{1}{50}$ grain (0.0013 gramme) three times daily. In the discussion of his paper, Krim, Irwin, Barbour, and Guntermann also praised the use of large doses of atropine. Potts ⁸⁰_{Apr. 16, '94} recommends quinine, which he has given in only two cases, and Brassert ¹¹⁶_{Aug., '94} advises turpentine to change the urinous odor of the bedding and clothing into an agreeable odor of violets. Robinson ¹⁹⁹_{July, '94} urges that

adolescents be advised to retain their urine as long as possible in the day-time, in order to increase the capacity of the bladder.

Other writers, not satisfied with medical treatment, have had recourse to local measures. Riedmann⁸¹⁴_{July 1, '94} praises gradual dilatation of the urethra with sounds. Hanc⁶⁵⁰_{June 14, 21, '94}⁹⁰_{July} treated 80 cases: (1) by passing a catheter and keeping it in the bladder for some minutes; (2) by passing an ordinary sound or dilating the posterior portion of the urethra; (3) by applying caustics to the posterior part of the urethra; and (4) by massage of the rectum and perineum by Thure-Brandt's method. Three cases were permanently cured by a single passage of the catheter; 12 were cured by the sound, and 15 improved by its use, but relapsed; 8 were cured by caustic treatment; 11 were improved, but relapsed, and 4 were not improved; one was cured by massage; 22 did not come again for treatment. The results do not seem very encouraging. Narich publishes a third paper²⁴_{June 24, '94} on massage of the vesical sphincter in women affected with frequent desire to urinate, or enuresis, claiming the best results. Logothetis²³²_{Mar. 15, '94} recommends for the same affections the method of Sanger, which consists in introducing a metallic sound as far as the sphincter and making pressure with it downward and on the sides. The good results obtained are due to more powerful contractions of the sphincter under direct irritation.

POLYURIA.

Mathieu¹⁰⁶⁰_{No. 19, '93} discusses the relative frequency of hysterical polyuria. It is more frequent in man than in woman and presents two forms,—a light one in which 8 to 10 pints (4 to 5 litres) of urine are passed in twenty-four hours, and a serious form in which the quantity reaches 30 to 40 pints (15 to 20 litres). The author lays great stress on the importance of suggestion in the therapeutics. In one grave case in which polyuria followed a blow on the head, recovery was obtained by hypnotic suggestion. In another case, in which from 40 to 50 pints (20 to 25 litres) of urine were passed daily, he administered a powder containing only sea-salt, but stated to the patient that it was a specific against diabetes, when the quantity of urine immediately fell to 5 pints (2½ litres). Juhel-R  noy¹⁷_{Mar. 8, '94} advises absolute rest and doses of 5 to 6 grammes (1¼ to 1½ drachms) of antipyrin in the treatment of azoturic polyuria.

ANURIA.

Michel ²⁶_{May 1, '94} reports the case of a man suffering from retention of urine due to stricture, in whom, at the end of 14 days, generalized anasarca with ascites developed. All the organs were healthy, and the urine contained no albuminuria. The two strictures were operated on and the anasarca disappeared. A patient of Carstens ¹⁸⁵_{Apr., '94} was suffering from cancer of the uterus when she was attacked with anuria, which lasted eleven days and caused death. The ureters were obstructed by the tumor at the point of entrance into the bladder, causing their dilatation and hydronephrosis. Kaefer ⁴_{Mar. 26, '94} reports the case of a man of 68 years, who had an attack of anuria lasting eight days, without pronounced symptoms, and terminating in colic. Shortly afterward another attack occurred, carrying off the patient at the end of five days from pulmonary œdema. The two ureters were obstructed by calculi. Leguen ¹⁴_{July 11, '94} also reports a case of calculous anuria, lasting five days and preceded by four days of hæmaturia. Left nephrolithotomy was performed and three calculi removed from the lesser pelvis and one from the ureter. Recovery followed. Sarda ⁴⁹⁴_{July 15, '94} publishes a case of nervous origin in a young woman of 22 years, lasting fourteen days, during which time she passed about 150 grammes ($4\frac{3}{4}$ fluidounces) of urine. When the function was re-established the urine was very dark and for several days showed a black sediment, which gave rise to the suspicion of a malign tumor. Sir Dyce Duckworth ¹⁰⁷⁷_{Aug. 16, '94} publishes an interesting clinical lesson on a case of anuria, without known cause, in a woman of 38 years. Suspecting calculus, laparotomy was performed without result, and the patient died. Autopsy revealed nothing, for there were no lesions with the exception of a slight degree of chronic nephritis.

SUPRARENAL CAPSULES.

Anatomy.—P. Manasse ¹²⁶_{July 16, '94} has found in man masses of medullary cells and even buds of the substance of the suprarenal capsules in the interior of veins, more frequently in the medullary than in the cortical substance. The same peculiarities were noted in the horse, the ox, the pig, and the sheep. The medullary tubes, the central portion of which is filled with brown hyaline masses secreted by the double row of cells seen on their

interior, project into the lumen of the veins, at this point deprived of their endothelial covering. It may therefore be concluded that the brown hyaline masses are secreted by the suprarenal capsules, and that they are carried into the circulatory stream after penetrating into the interior of the veins. B. S. Nicholson ²_{Feb. 24, '94} was surprised at a necropsy to find a gland one and one-half inches long and one and one-fourth inches from side to side, attached by fibrous adhesions and vascular tissue to the transverse mesocolon, having, as relations, the pancreas behind and above, the transverse colon in front. The gland proved to be a suprarenal capsule. The presence in the suprarenal capsules of biliary acids (Virchow), of hippuric acid (Cloeze and Vulpian), and of benzoic acid (Seligsohn) is denied after recent careful research by Bier and Stadelmann. ⁴¹_{Aug. 6, '94}

Tumors.—Lazarus ²²_{May, '94} showed a tumor taken from a child, aged $3\frac{1}{2}$ years, in whom the disease began with pain in the body, which soon became swollen. A firm, hard tumor was observed in the right upper part of the abdomen, and was taken for disease of the liver. The child became pale and feeble; the hæmoglobin of the blood fell to 50 per cent.; there was no fever and no discoloration of the skin. Emaciation was rapid, and eight days after admission to hospital the patient succumbed. On section the abdomen was found to be filled with a tumor weighing 12 pounds ($5\frac{1}{2}$ kilogrammes), the entire weight of the child being 37 pounds (17 kilogrammes). The growth originated in the left suprarenal body, was firmly adherent to the kidney, and proved to be sarcomatous. The liver appeared like a sheet of paper enveloping the tumor. M. Cohn ³⁶⁰_{May, '94} observed a primary medullary sarcoma of the right suprarenal capsule in a child 9 months old. There were multiple metastases, particularly in the head, the thorax, the two kidneys, the ovaries, and the liver. Bérard ²¹¹_{Apr. 29, '94} reports the case of a woman of 26 years who suffered from intense pain in the left arm and extensive swelling of the shoulder and axilla. At the autopsy a large tumor was found occupying the region of the first five ribs. The right suprarenal capsule was replaced by a tumor the size of a fist, which proved to be an epithelial cancer. (See also "Solid Tumors," this article).

Hæmorrhage, Infection.—Roger ¹⁴_{Jan. 31, '94} has found that inoculation of the guinea-pig by a pure culture of the pneumobacillus

of Friedländer is followed by abundant hæmorrhage of the suprarenal capsules, the blood bursting through the great capsular vein and causing necrosis of the elements by mechanical compression. These hæmorrhages do not occur in the rabbit. Pilliet¹⁴_{Feb. 7, '94} has also observed such hæmorrhage after intoxication by essence and nitrate of uranium. Hydrochlorate of hydroxylamin causes accumulation of crystals of methæmoglobin. Langlois¹⁴_{Feb. 7, '94} saw hæmorrhages produced by the pyocyaneus bacillus. Pilliet⁷_{No. 19, '93} in a case of cancer of the pancreas, observed a secondary infection in the capsule,—not abscess, but a true vascular cirrhosis, with lobulation of the gland and atrophy or necrosis of the parenchyma.

Addison's Disease.—Blackader²⁸²_{Nov., '93} presented a patient suffering from this affection, which he proposed treating by suprarenal capsules, finely minced. Adami approved of the method and recalled a case which had recovered under the use of arsenic. Auvray⁷_{No. 19, '93}, Whittaker⁴²⁶_{Dec., '93}, M. Case¹⁰⁶_{Dec., '93}, Dupont²¹¹_{Mar., '94}, and Vailant⁵⁷⁷_{Apr., '94} report classical cases. The case of Bureau¹²⁷_{Feb., '94} progressed rapidly, death occurring in five months. The patient had plaques of vitiligo on the hands. Death occurred two months after the beginning of symptoms in the case reported by Mouisset²¹¹_{May 27, '94} in which one of the capsules presented an old tuberculosis, while in the other there were only recent granulations. Death had been hastened by intercurrent erysipelas. Influenza had the same unfavorable influence upon the disease in a case recorded by Liesching²_{May 5, '94}. Addison's disease may terminate in sudden death, as shown by a case reported by Letulle⁷_{No. 6, '94} in which the patient was supposed to be suffering from malarial cachexia and died in syncope. Autopsy revealed the true nature of the disease, showing the two capsules to be transformed into fibrocaseous blocks the size of a mandarin.

II. Neumann⁶⁹_{Feb. 1, '94} reports a case of recovery in a man of 57 years who, in April 1885, was suddenly attacked by weakness, anæmia, pigmentation of the mucous membranes, bronzed skin, and, a little later, pain in the region of the capsules. Strength returned little by little; so that in September, 1886, he was able to pass half an hour out of bed. At the same time the pigmentation grew less marked and gradually disappeared. At the end of two years the patient could be considered as cured, and recovery has since been maintained. Thompson⁵_{Oct., '93} apropos of six cases,

four with autopsy, presents a complete study of the disease. According to him, it is a syndrome depending on irritation of the abdominal sympathetic from direct lesion of the nerve, its ganglia, or the suprarenal capsules. This lesion is most frequently primary or secondary tuberculosis of the capsules with secondary involvement of the sympathetic; in less than 20 per cent. it is not tuberculous, and in 12 per cent. of the cases the capsules remain normal. Auld²_{May 12, '94} is of the opinion that one of the functions of the capsules is to destroy a part of the used-up red corpuscles. If this excretory or depurative function is interfered with, the circulation of the decomposition products of hæmoglobin causes Addisonian poisoning. He attributes this rôle to the medullary substance, the rôle of the cortical substance being to furnish a secretion which is taken up by the lymphatics, and which is indispensable to the needs of the organism.

Chauffard³_{Feb. 14, '94} believes that most of the symptoms of the affection indicate an intoxication, and he recalls the experiments of Abelous and Langlois, who have shown that animals deprived of the capsules die poisoned, and that their blood shows a special toxicity. If a small portion of the suprarenal parenchyma be retained, the intoxication is neutralized and life remains possible. In Addison's disease, adynamia, gastric disturbances, and the terminal symptoms of cardiac collapse, hypothermia and coma, appear to him to be purely toxic phenomena; however, he has not always succeeded in provoking them with hypodermatic injections of suprarenal juice. Finally, he does not believe that all the symptoms depend upon intoxication, the pigmentation of the skin and mucous membranes being in relation to lesions of the sympathetic. Ch. Audry¹⁰⁸⁸_{July 29, '94} examined the skin in one case of the disease, and describes pigmented clasmatocytes, which, after having penetrated by migration, fix themselves upon the supporting elements of the derma.

URINALYSIS.

General Considerations.—Different authors have introduced apparatuses for the analysis of urine, among them being Lohmstein,¹¹⁶_{Aug., '94} Binet¹⁹⁷_{Mar. 20, '94} (mercury ureometer), Fletcher and Stevenson⁶_{Oct., '93} (thermo-urinometer), and Maestrelli.⁵³¹_{Dec., '93} Rywosch⁵⁷_{Oct. 29, '93}

has studied the urine in a series of animals, beginning with bony fishes, and insists upon the presence of urea. Stefani⁹⁹⁶_{July 25, '94} observed that the specific gravity of the urine remained normal in chronic cases of insanity and increased in acute cases from 1030 to 1040 and over; acute attacks in the chronic cases also increased the specific gravity. D. Turner²⁰⁰⁰_{v. 19, '91, '92} estimates the average electrical resistance of urine to be 40 ohms. Generally speaking, the resistance is in inverse proportion to the solid elements held in solution, or, in other words, to the specific gravity. There are two exceptions to this rule,—pneumonia (absence of chlorides) and diabetes (diminution of salts and urea), in which the resistance as well as the specific gravity is increased.

Quinke⁹⁹⁶_{Mar. 25, '94} recalls the fact that the secretion of urine is less in the normal state during the night than during the day, in the proportion of from 1 to 4 to 1 to 2. In a great many cases observed by him this ratio had become so modified as to be 2 to 1, as in cardiac and renal affections, arterio-sclerosis, diabetes, etc. There is not only an increase in the watery constituents, but also in the solids. Lydston¹¹⁵_{Sept., '93} indicates the details to be learned from the examination of the urine, and T. Wood⁹⁹_{May 17, '94} discusses an interesting case of alkaptonuria and the importance of this condition in life-insurance. A. Geyer²¹⁴_{Feb. 1, '94} publishes a general article on urinalysis, and Russell⁸⁵⁸_{v. 3, '94} discusses the subject from a gynecological stand-point.

To estimate the alkalinity or acidity of the urine Freund and Toepfer⁸³_{Feb. 20, '94} measure not the total alkalinity or acidity, but all the alkaline or acid substances separately. They use, as indicators, phenolphthalein at 1 per cent., alizarin at 1 per cent., and Poirier's blue at $\frac{1}{2}$ per cent., with normal sodium solutions or hydrochloric acid. Foshay⁴⁵¹_{Nov., '93} analyzed the urine of two patients (who had undergone nephrectomy) for nearly six weeks, and found that the quantity reached a maximum in the third week, while the maximum excretion of salts took place in the third week in one case and in the fourth in the other; the urea attained its maximum one week before the total solids. The urine contained pus and epithelial cells during the whole of the first week. Charrin¹⁴_{Jan. 31, '94} noted in rabbits, into which he had injected pyocyanic toxins, urinary variations, consisting of an increase of urea and phosphoric acid and a diminution of chlorine, and which, together with the

elevation of temperature, show that these toxins are pyretogenic. According to Tschersichew, ⁵⁸⁶_{No. 46, '94} the daily absorption of ammonium increases the urinary secretion and the percentage of non-oxidized products and of neutral sulphur in the urine, while the reaction is not modified.

E. Schütz ⁸³_{June 23, '94} tested for lactic acid in the urine of thirty patients suffering from various affections,—as of the liver and heart, tuberculosis, peritonitis, cancer of the stomach and œsophagus, leukaemia, etc.,—and in none of them was he able to find lactic acid. According to Hopadze, ¹²⁶_{Apr. 15, '94} the absolute and relative quantity of ethero-sulphuric acid in the urine is increased, in cirrhosis and cancer of the liver, from stasis in the portal circulation and concomitant gastric disturbance. Eiger ¹³_{June, '94} arrives at the same conclusions as regards affections of the liver and one case of Addison's disease observed by him. He believes the increase to be in relation to a decreased capacity of the liver to transform by oxidation the aromatic series.

Contrary to general experience, Ulrich ⁹⁹⁶_{July 10, '94} constantly found leucin in the urine of twelve healthy men and one woman in the ninth month of pregnancy. He has also demonstrated its presence in a great many affections of diverse nature,—mild or severe diseases of the liver, chronic nephritis, diabetes, tuberculosis, typhoid fever, cystitis, etc. He notes the fact that, in spite of chemical tests (he employed Neubauer and Vogel's method), leucin may be invisible under the microscope. Bernsdorf ²¹_{Feb. 3, '94} observed a case in which the urine presented all the characteristics of chyluria. It was that of a boy of 11 years, who had never left the town of Riga, Russia, and in whom the presence of filaria could not be suspected. L. Greene ¹⁰⁵_{Jan. 1, '94} has made extensive researches on the diazo reaction of Ehrlich. This, as is known, consists in a saturated solution of sulphanilic acid, 40 cubic centimetres ($1\frac{1}{4}$ fluidounces) of which are mixed with 7 cubic centimetres ($1\frac{3}{4}$ fluidrachms) of a $\frac{1}{2}$ -per-cent. solution of sodium nitrite. An equal quantity of urine is added and, having been shaken, 1 or 2 cubic centimetres ($15\frac{1}{2}$ or 31 minims) of liquid ammonia are dropped into it, when a red color appears. This reaction was first given as characteristic of typhoid fever, but it has been necessary to extend it to many other diseases, as tuberculosis, meningitis, eruptive fevers, etc., and even to normal urine.

In fact, if the amount of sodium nitrite be increased, the red color, which alone can be accepted as of value, is found in normal urine. But if, instead of a mixture of two solutions at $\frac{1}{40}$ a mixture of $\frac{1}{100}$ be used, the red color, according to Greene, appears only in typhoid fever. In the discussion of this paper, Bracken and Jones refused to admit any value for the diazo reaction. Ouchterlony, ²²⁴ May 10, '94 on the other hand, regards it as important. W. Nissen has ³⁶⁶ Aug 6, '94 carefully studied its prognostic and diagnostic value in four hundred and sixty-two cases of children's diseases. Ehrlich's test is constant in measles, typhoid fever, and miliary tuberculosis, frequent in tubercular meningitis, and occasional in pneumonia, pleurisy, diphtheria, erysipelas, etc. It may be of some value in diagnosing typhoid fever, and probably bears a relation to the presence in the urine of substances derived from changes in the nutrition of the micro-organisms. It appears after the injection of microbial toxins, and Wladimiroff ²¹ Feb. 17, '94 gives this reason for believing that its employment can lead to no precise results.

Urea, Nitrogen, etc.—Carrez ²²⁰ Sept. 29, '93 proposes a new process for measuring urine. To 2 cubic centimetres (46 minims) of urine, diluted to 20 cubic centimetres (5 fluidrachms) with subacetate-of-lead solution and phosphate of sodium, 20 cubic centimetres (5 fluidrachms) of standard hypobromite are added and shaken to cause the reaction; 4 grammes (1 drachm) of iodide of potassium are then added, the mixture acidified with 20 cubic centimetres (5 fluidrachms) of hydrochloric acid, and diluted to 200 cubic centimetres (6½ fluidounces). The iodide solution thus obtained is brought up to standard by a decinormal solution of sodium hyposulphite, or Mohr's arsenical fluid, in the presence of starch. Ten cubic centimetres (2½ fluidrachms) correspond to 0.127 gramme (2 grains) of iodide, which equals 0.01 gramme ($\frac{1}{10}$ grain) of urea. Bureker ²⁴⁵ Mar., '94 discusses the method of Kjeldahl and the various modifications which have been made in it. Richet ¹⁴ June 13, '94 states that there exists in the liver a soluble ferment, or diastase, acting upon the albuminoid substances to produce urea, or at least a nitrogenous substance decomposable by urea tests. Kaufmann ⁸⁶⁰ July, '94 exposes the present ideas as to the formation of urea in the organism. All the tissues of the body produce urea, but in varying quantities, the liver being the most active in mammals. The mechanism of its formation is as yet unknown; one portion results

from a simple hydration of the albuminous molecule without the intervention of oxygen; another portion appears to be the result of a series of separations, oxidations, and even syntheses.

Lieblein²⁷³_{Nos. 3-5, '94} has studied the excretion of nitrogen in dogs after destruction of the liver by the injection of diluted sulphuric acid, the animals succumbing in from twenty-eight to forty hours. It was expected that there would be a great diminution of uric acid and an increase of ammonia following suppression of the uropoietic function of the liver; analysis showed, however, a great increase of uric acid, the ratio of ammonia to the total nitrogen and urea not changing except for a slight increase in the last hours of life. Death was, therefore, not due to a disturbance in the secretion of nitrogen, but to a late intoxication. Surmont and Brunelle³⁶⁰_{July, '94} discuss the elimination of nitrogen through the urine in the course of and in convalescence from saturnine colic. It is a general rule that the total quantity of nitrogen is diminished during the course of the colic, seeming to bear some relation to the suppression or diminution of alimentation. The urea is diminished and increases when the colic ceases; uric acid is increased in relation not to the colic, but to the lead poisoning; creatin and hippuric acid are eliminated in a greater quantity than normal during the colic and in convalescence.

A. Jolles⁵⁷_{Oct. 20, '93} arrives at the following conclusions, as a result of numerous researches on the nitrites in urine: 1. The nitrites are sometimes met with in cloudy urine due to acid fermentation. 2. It is not known why the test for nitrites is not constant in these cases. 3. The diluted sulphuric-acid and iodide-of-potassium test in the presence of starch is insufficient for normal and pathological urine. 4. The best reagent is sulphanilic acid and sulphate of beta-naphthylamin, which will reveal 0.000032 gramme ($\frac{1}{20000}$ grain) of N_2O_3 in 100 cubic centimetres ($3\frac{1}{4}$ fluidounces) of urine. 5. For qualitative research Schäffer's test (potassium ferrocyanide and acetic acid), which gives a result with 0.000045 ($\frac{1}{14000}$ grain) in 100 cubic centimetres ($3\frac{1}{4}$ fluidounces) of urine, is quite sufficient. 6. For quantitative research Deventor's test should be rejected, while the colorimetric method of Trommsdorf gives approximate results.

Borissow⁸³_{June 20, '94} has studied the phenomena of poisoning by diamidsulphate and dibenzoyldiamid, finding that the first causes

the appearance in the urine of a rather large proportion of allantoin, while the results obtained with the second were contradictory. If the liver produce uric acid, which, by oxidation, gives allantoin, and urea, which may originate from allantoin, it is to be presumed that the appearance of the latter in the urine is caused by the action of the above poisons on the hepatic cells.

Uricæmia.—(See also “Renal Calculi.”) Deniges,²⁵_{Mar., '94} gives in detail a method derived from that of Haycraft for the estimation of the xantho-uric compounds of the urine. It consists in utilizing the formation, in liquid ammonia, of the double cyanide of silver and potassium, and using iodide of potassium as a developing agent. This method is applicable to all cases, even albuminous urine, provided the patient has not taken iodide of potassium. Kisel¹²⁶_{Apr. 16, '94} tested for uric acid seventy-one times in thirty-eight children and found a great variability,—between 0.06 and 0.78 gramme (1 and 12 grains) per litre (quart), or from 0.03 to 0.54 gramme ($\frac{1}{2}$ to $8\frac{1}{3}$ grains) in twenty-four hours. Haig¹⁷⁸_{Sept., '93} has endeavored to determine whether the ingestion of uric acid increased the excretion of this substance by the urine, the current opinion being that, in such cases, there was an increase of urea. If care be taken to maintain the solubility of the uric acid in the blood by means of salicylate of sodium, excretion is increased proportionately to ingestion not on the first, but on the second and third day. This increase, which is real, is due to modifications of the metabolism under the influence of uric acid. Sewall refutes⁹_{Sept. 16, '93} these opinions of Haig, notably that the production of urea and uric acid is in constant relation. He also does not admit that the urea is never retained in the organism and is eliminated *pari passu* with its formation. He rejects the theory that acids free the blood of uric acid by depositing it in the tissues, while alkalies lead to the solution of this precipitate and charge the blood with uric acid. On the contrary, Ferguson,¹¹³⁴_{Sept., '93} from researches made on himself for one thousand days, found a daily elimination of 363 grains (23.2 grammes) of urea and 11 grains (0.7 gramme) of uric acid, which corresponds exactly to the ratio of 1 to 35, indicated by Haig. Chittenden,⁹⁴⁶_{Feb., '94} in a review of the origin of uric acid, admits, with Horbaczewski and his pupils, that it originates from nuclein, probably through the intermediary of adenin, the relation of which to xanthin and hypoxanthin is quite

evident. A clinical lecture by Da Costa ¹¹²_{May, '94} is also an excellent *résumé* of the present knowledge on the subject of lithæmia. Lemen ⁸²_{May 12, '94} is of the opinion that uric acid is an irritant of the kidney and that its excessive elimination causes Bright's disease. Levison ⁹⁹⁶_{Aug. 25, '94} also states that uratic arthritis is closely allied to granular atrophy of the kidneys. Uric acid and the gouty diathesis, according to Faught, ⁸⁰⁵_{June, '94} play a marked rôle in dental erosions and pyorrhœa alveolaris.

Wiest ³⁶⁴_{Dec. 16, '94} attributes to retention of uric acid chronic affections of the throat, migraine, headaches, and neuroses,—an opinion shared by Squire ¹⁸⁶_{Apr., '94} as regards headache. Schmidt ⁶⁸_{Aug., '94} has studied the urine of twenty-four hysterical and neurasthenic patients, of whom only six showed an excessive elimination of uric acid. These patients presented psychical depression; but it is to be noted that this condition is far from always causing an excess of uric acid.

Different methods of treatment have been proposed for lithæmia. Griffin, ¹⁷⁶_{Feb., '94} besides dietetic treatment, recommends phosphate of sodium and acetate of potassium combined with podophyllin. Welling ¹⁹_{July 14, '94} rejects all remedies except cascara sagrada. Alexander ⁴¹_{Apr. 2, '94} believes in the efficacy of mineral waters, especially the increased ingestion of fluids, recommending lavage of the stomach when there is excess of hydrochloric acid, on account of the modifications which this condition causes in the reaction of the blood and the acidity of the urine. Barbour ⁷¹_{June, '94} recommends the use of piperazine in doses of 15 grains (1 gramme) daily.

Oxaluria.—Adler ²⁴²_{Mar., '94} states that oxalic acid is a normal constituent of urine, derived especially from the food. He does not, however, deny the possibility of a slight production by normal metabolism, though the conditions of this production are not known. He does not believe that the nervous symptoms, which have been given as characteristic of pathological oxaluria, are caused by an excess of oxalic acid in the blood and urine. Boursier ²¹²_{June 25, '94} has made a complete study of this subject. The most frequent symptoms are: disturbances of digestion; nervous and, especially, neurasthenic troubles; renal pain, sometimes turning to colic; frequent hæmaturia, and irritable bladder. In oxalic gravel colic is more frequent, more intense, and more painful than in uratic gravel, and is generally accompanied by hæmaturia. The author supports

the theory of Beneke, that an arrest in the transformation of nitrogenous substances leads to the production of oxalic acid,—a less advanced product of oxidation than uric acid. Digestive troubles sometimes play a considerable rôle, so much so that oxaluria would seem to be rather a symptom of dyspepsia than a distinct disease.

Phosphates.—Richard ⁸⁸_{Nov. 11, '93} recommends the following method for separating the alkaline and earthy phosphates of urine: 30 cubic centimetres (1 fluidounce) of urine and 30 cubic centimetres (1 fluidounce) of a 5-per-cent. solution of caustic soda are mixed and allowed to stand for twenty-four hours, when 30 cubic centimetres (1 fluidounce) of the clear liquid remaining is poured out, free from earthy phosphates. To this is added 2 cubic centimetres (31 minims) of a 30-per-cent. solution of acetic acid to neutralize the soda and 5 cubic centimetres ($1\frac{1}{4}$ fluidrachms) of a solution of acetic acetate (50 grammes— $1\frac{1}{2}$ ounces—of acetate of sodium, 50 grammes— $1\frac{1}{2}$ ounces—of acetic acid, water to make 1 litre—quart) heated to 60° C. (140° F.) and titrated with uranium. For the balance of the liquid, 2 cubic centimetres (31 minims) of acetic-acid solution and 5 cubic centimetres ($1\frac{1}{4}$ fluidrachms) of acetic acetate are also used to dissolve the earthy phosphates and place it in identical conditions of acidity for titration. A. Robin separates ¹⁰_{Dec. 19, '94} from Bright's disease certain albuminurias connected with functional disturbances of nutrition, which may be cured or may end in a renal lesion. Its characteristic is organic demineralization. This phosphatic albuminuria comprises four varieties: (*a*) simple phosphaturic albuminuria, confounded with cyclical or intermittent albuminuria; (*b*) pseudoneurasthenic phosphaturic albuminuria; (*c*) *pseudobrightique* or *prébrightique* phosphaturia, confounded with interstitial nephritis; (*d*) albuminuria of Bright's disease of phosphaturic origin. Thorndike states ⁹⁹_{Feb. 3, '94} that phosphaturia is met with: 1. In cases where there is digestive or nervous disturbance, the phosphatic urine indicating a diminution of the acidity; though this may be called phosphaturia from a chemical stand-point, the term is not precise clinically. 2. In severer and long-continued cases, corresponding to phosphaturic diabetes insipidus. Here also there are no definite clinical conditions. Wood ⁹⁹_{Feb. 3, '94} accepts this statement for the first class of cases, but not for the second. Klotz ¹⁵⁰_{Feb. 15, '94} gives a good review of the subject, and dwells upon the relation existing

between phosphaturia and diseases of the nervous and digestive systems.

Chlorine.—Berlioz and Lépinois ¹⁴_{Jan. 24, '94} state that the chlorides of the urine consist of fixed mineral chlorides and organic chlorine compounds. In the normal state the quantity of chlorine in combination varies from 10 to 40 per cent. It diminishes during fasting and increases during digestion; so that it may furnish some information as to the condition of the digestive organs. Richard ⁸⁶⁸_{May 26, '94} also states that the urine contains chlorine precipitable by nitrate of silver,—that is, fixed chloride,—and also chlorine non-precipitable by the same agent, or organic combinations. He proposes the following method of estimation: (*a*) for the fixed chlorine direct titration of the chlorides with silver nitrate in 2 cubic centimetres (31 minims) of urine, to which a few drops of neutral chromate of potassium have been added; (*b*) boiling 2 cubic centimetres (31 minims) of urine and 1 cubic centimetre ($15\frac{1}{2}$ minims) of a concentrated solution of caustic soda, saturating with nitric acid, the addition of an excess of silver nitrate, and, after the mixture has cooled, the addition of ferric sulphate, and titration of the excess of silver nitrate by sulphocyanide of potassium. Gérard ¹⁰⁸⁸_{May 27, '94} praises the method of Freund and Toepfer, which consists, before estimating with a titrated solution of silver nitrate, of adding to the urine a solution of acetic acid and acetate of sodium, to prevent the action of the silver nitrate on the uric acid, xanthin, coloring matters, etc., present. He believes, however, that precipitation of a certain quantity of uric acid does take place.

Carbohydrates.—K. Baisch ⁸⁸_{Jan. 23, '94} has applied his method of mixing the urine with chloride of benzoyl and sodium to estimate the amount of hydrocarbons present in normal urine. He has been able to demonstrate the presence in these combinations of glucosazone, and believes that the glyucose eliminated daily varies from 0.08 to 0.18 gramme ($1\frac{1}{4}$ to $2\frac{1}{2}$ grains), and that of the reducing hydrocarbons from 0.32 to 0.12 gramme (5 to $1\frac{7}{8}$ grains). He also found—though not entirely freed from salts—a substance allied to dextrin, to which he attributes various properties (demonstrable by furfural and not by Fehling's solution, precipitable by alcohol, etc.). He also found another carbohydrate substance in combination with benzoyl, but not susceptible of fermentation.

In an interesting article on some common sources of error in testing for sugar in urine, George Johnson⁶ July 7, '94 again takes up the question as to its presence in normal urine, concluding in the negative. If a fourth of the reduction in Pavy's test is due to uric acid, the other three-fourths are not due to glucose, as Pavy believes, but to creatinin, as shown by his son, W. Stillingfleet Johnson. If, as Pavy claims, sugar existed in normal urine in the proportion of 0.05 per cent., it would not be difficult to demonstrate it. The reducing substance found by Pavy, besides creatinin, is very probably an artificial product. This opinion is contested by Allen⁶ July 28, '94 and Pavy,⁶ July 14, '94 who ask: "If there be no sugar, what is the origin of the crystals of osazone so readily obtained in the normal urine of man and the lower animals?" Johnson⁶ July 21, '94 replies that the urine of inferior animals is not to be compared to that of the healthy man, and that phenylhydrazin is not a perfect reagent.

Daiber⁸¹⁴ June 15, '94 recommends the Böttger-Almèn test (the alkaline solution of tartrate of bismuth), and Curnow⁶ Aug. 4, '94 and Blondeau¹¹¹⁰ Apr., '94 phenylhydrazin, either to determine the presence of slight traces or to confirm its absence in doubtful cases in which the urine reduces cupro-potassic solutions. According to Whicello,⁶ July 28, '94 the urine of persons taking sulphonal will reduce Fehling's solution. Reale⁵⁹⁶ Mar., '94 reports, in detail, a case of pentaglycosuria or pentosuria in a morphinomaniac. But one similar case has thus far been published,—that of Salkowski and Jastrowitz, also in a morphinomaniac.

Cystin.—The method of quantitative analysis given by Borisow⁸³ June 23, '94 is based on the fact that hydrochlorate of cystin forms an insoluble crystalline combination with chloride of mercury in solution, containing three molecules of chloride of mercury and two molecules of cystin. The method is applicable to the urine, though somewhat difficult; it is not impossible, but also not easy, to cause the precipitation of all the cystin, while the mercurial precipitate extracts other substances with it, especially urea.

Pfeiffer⁹ June 9, '94 reports the case of a family in which the members and several paternal uncles were gouty. The children, two boys and two girls, presented cystinuria. The condition was discovered in the eldest daughter, who suffered from pyelitis and cystitis, after the passage of a calculus, which was recognized as cystin.

Her two children did not present any cystinuria, but her sister and two brothers showed cystin in the urine without calculi.

Albumin.—According to Guerrieri,¹²⁶_{Apr.15,'94} Spiegler's test (sublimite 8, tartaric acid 4, sugar or glycerin 20, distilled water 200) does not reveal albumin in the urine except through the chlorides; if these are absent, as may sometimes be the case, the albumin may pass unnoticed. The urine should be acidified not with acetic acid, as Spiegler recommends, but with hydrochloric acid. G. Sharp⁶_{Mar.3,'94} also states that, if the urine contain only a fourth of the normal quantity of chlorides, the test is very slow in acting; while, if there be but an eighth part, it fails entirely. In certain cases of gouty kidney or pneumonia the chlorides may greatly diminish or entirely disappear; and, on the other hand, if they are present in excess they redissolve the albumin.

G. Jolmsen⁶_{June 23,'94} protests against an assertion of Poore,⁶_{June 16,'94} that potassio-mercuric iodide and picric acid are of no value in testing for albumin. He regards picric acid as one of the most reliable of reagents. D. Stewart⁹_{May 6,'94} states that most of the recently-proposed tests may lead to error, since they precipitate the nucleo-albumin present in all urine, and the origin of which is extra-renal. With picric acid itself more importance should be attached to negative than to positive results. Trichloracetic acid appears to him especially fallacious. He examined the urine of 105 healthy young persons, all giving the reaction with trichloracetic acid except 3, and in these it was obtained by leaving the tube for a few seconds in hot water. Only 11 out of 52 showed no reaction with picric acid, and 10 out of 52 with metaphosphoric acid. Of the 105 cases 20 gave the reaction with nitric acid; and, as only 1, under appropriate examination, could be supposed to have a renal affection, it is probable that in the 19 others the presence of albumin was due to fatigue. Trichloracetic acid is inferior to metaphosphoric acid, which, in itself, is inferior to picric acid. The same objections may be made to the tests of Sébelein, Tanret, and Millard. In a second paper⁹_{July 14,'94} the same author maintains his position, and replies to E. Simon,⁹_{Aug.4,'94} who defends trichloracetic acid.

D'Amore⁵⁸⁹_{Sept.19,'93} studied carefully the citro-picric test, finding it not without inconvenience, but possessing the great advantage of forming, with many alkaloids, leucomaines and ptomaines,—

piciates which crystallize in characteristic shapes, of great value in the examination of the urine. E. de Renzi ⁵⁹⁶_{Dec., '93} gives the history of a patient with icterus whose urine was tested by boiling followed by the addition of acetic acid. An abundant precipitate of biliary salts occurred which might easily have been mistaken for albumin. Laquer ¹²⁶_{Apr. 15, '94} recommends a method of testing at the same time for albumin and sugar. The urine is boiled in a tube and one-tenth diluted nitric acid added, at one time, and not drop by drop. If albumin be present a flaky precipitate is observed; if the urine remain clear 10 to 20 drops of Almèn's fluid (4 grammes—1 drachm—of Seignette salt in 100 parts of caustic soda at 10 per cent. placed in a water-bath, with 2 grammes— $\frac{1}{2}$ drachm—of subnitrate of bismuth) are added, the mixture is boiled again, and, if it become dark colored or black, sugar is present.

D. Boyd ³⁶_{May, '94} has studied the relative proportion of the two proteids of urine in albuminuria. He does not believe that it is possible to diagnose the character of the renal lesion by this proportion on account of its variability. Globulin may not be in excess even in cases of amyloid degeneration; in the albuminuria of pregnancy serum and globulin exist, the latter predominating; it is also more abundant in affections of the heart than in interstitial nephritis; finally, in acute nephritis, the two albumins are present in equal quantity, except in cases of hæmaturia, when globulin is more abundant. N. Paton, ²⁰⁰⁰_{Nov. 19, '91, '92} in a specimen of urine containing 1.92 of globulin and 0.08 of albumin out of 2 grammes ($\frac{1}{2}$ drachm) of total proteids, was able by dialysis, to isolate the globulin in a crystal state. The same urine when left to itself gave a spontaneous crystallization of the globulin, the crystals, of an elongated rhomboid form, terminated by a characteristic angle, sometimes being precipitated in a day or two, sometimes after weeks and even months, the urine remaining acid.

Flensburg ¹²⁶_{Apr. 15, '94} examined the urine of 53 healthy men aged from 18 to 22 years, finding transitory albuminuria in more than half of them. Cylinder-casts were not observed, and in many cases there was no nucleo-albumin. Hwass ⁹⁹⁶_{Mar. 10, '94} examined 635 soldiers from 20 to 30 years of age and found albuminuria in 98, or 15.4 per cent. The urine examined was that passed in the morning on rising and at noon before the meal, Keller's test being employed. There were 3 cases of marked nephritis, 19 of sup-

posed renal alteration, 35 cases that could not positively be declared healthy, and 23 in whom it was impossible to give a decided judgment. Tiemann¹_{Mar.17,'94} insists on the frequency of albuminuria in young persons. In nearly 2000 urines examined, mostly that of adults, he found only 9 per cent. of albuminuria; but, in examining persons below 21 years of age, the proportion reached 27.4 per cent. He also examined the urine of children and of adolescents from 10 to 20 years, a first series of 104 cases showing albuminuria 31 times, or 29.4 per cent., and a second series of 136 cases 22, or 16 per cent. The addition of the two series gives 240 analyses, with 53 cases of albuminuria, or 22 per cent., and 3 cases of glycosuria.

Pichler and Vogt³¹⁹_{Apr.28,'04} observe that proteid substances in the urine consist not only of serum, albumin, and globulin, but likewise of nucleo-albumin. The latter is characterized by its insolubility in acetic acid, its precipitation by magnesian sulphate, and by the separation of no reducing substance by boiling with dilute mineral acids. It must be distinguished from globulin and mucin. It appears when any damage is done to tissue-cells or, more seldom, when secretions containing nucleo-albumin, such as bile, get into the blood. The injection of casein in dogs causes nucleo-albuminuria. The limitation of the supply of oxygen or the temporary obstruction of the femoral or renal artery will give rise to nucleo-albuminuria. The only changes in the kidney observed by these authors were fat in the cells and some protoplasmic alteration of the convoluted tubules. Experiments thus show that the renal tissue may be the source of nucleo-albuminuria, which is often in reality the so-called cyclical albuminuria.

Weidenfeld⁵⁷_{Nov.12,'93} regards the albuminuria called "physiological" and the form called "intermittent" as belonging to the same group, and due not to disturbances in the circulation, but to disturbances in the nervous system. In the discussion of this point Kraus stated that all intermittent albuminuria is in reality persistent, as it may continue for years with the same cycle, the albuminuria diminishing and even disappearing, as may be seen even in confirmed Bright's disease. Sternberg dwelt on the transitory form of albuminuria met with in 3 to 4 per cent. of the cases of chlorosis, especially where there is venous thrombosis, leading him to suppose that there may be very small thromboses in the renal

vessels. Reckmann ³⁶⁶_{Aug. 6, '94} reports two cases in children 10 to 14 years of age, the first of which appears to him to be a case of true cyclical albuminuria, while the other is a true nephritis in spite of the cyclical appearance of the albuminuria. Neumann ¹²⁶_{July 15, '94} states that constant albuminuria may be of two types: one in which the quantity of albumin eliminated seems to be independent of the quantity of urine excreted, and another in which these quantities are proportional.

S. Wood, ⁹⁹_{May 24, '94} excluding albuminuria depending on modifications of the blood, divides the causes into three groups: (1) organic affections of the kidneys; (2) renal disturbances not due to organic disease; (3) diseases of the urinary or genito-urinary passages attended with suppuration or hæmorrhage. Vanderpoel recognizes ⁵⁹_{Nov. 11, '93} three principal types of albuminuria without manifest renal lesions: 1. Simple albuminuria, the causes of which are food, exposure to cold, cold baths, muscular effort, mental fatigue, and prolonged cerebral activity. 2. The uric or oxaluric form, which is probably due to irritation of the kidneys by crystals of uric acid or oxalate of lime; with Da Costa, he classes under this category the majority of cases of albuminuria in adolescents. 3. The neurotic type, as albuminuria following puncture of the fourth ventricle (Claude Bernard), attacks of epilepsy, chorea, apoplexy, hysteria, exophthalmic goitre, etc., probably depending on circulatory disturbance from vasomotor action.

C. Gray ¹³⁹_{July, '94} calls attention to the albuminuria observed in neuroses, and particularly in neurasthenia.

C. Shattuck ⁹⁹_{June 21, '94} closes an excellent paper with the following conclusions: 1. Renal albuminuria, as proved by the presence of both albumin and casts, is much more common in adults, quite apart from Bright's disease or any obvious source of renal affection, than is generally supposed. 2. The frequency increases steadily and progressively with advancing age. 3. This increase with age suggests the explanation that albuminuria is often an indication of senile degeneration. 4. It is highly probable that faint traces of albumin and hyaline and finely granular casts of small diameter are often, especially in those past 50, of little or no practical importance. Semmola ⁸¹⁴_{May 16, '94} gives a review of his well-known theory as to the chemical molecular modifications of the albumin of blood, permitting its passage through the renal filter.

Peptones.—Wesener¹⁰⁵²_{Jan., '94} insists upon the fact that peptonuria exists in all cases in which there is inflammation or production of pus. He recommends the biuret test, comparing the colors obtained with titrated solutions of peptone. Robitschek examined one hundred and twenty-one patients suffering from different diseases and found peptonuria sixty times. There is no physiological peptonuria except that of pregnancy, and in all other cases it is pathological; but, from the present clinical stand-point, only pyogenic peptonuria is of importance. In a general way, the appearance of peptone in the urine indicates a destruction of the tissues of the organism. The author has employed Hofmeister's and Devoto's test, and considers the latter the more practical. L. Sior³⁶⁶_{Apr. 19, '94} has tested urine, milk, and pus for peptones. He examined the urine in four cases of scarlatina, 2 cases of measles, 2 of diphtheria, 3 of pneumonia in a state of resolution, 1 of pleurisy, 1 of perityphlitis, and several cases of abscess. The urine was reduced one-tenth of its volume in a water-bath, precipitated by sulphate of ammonia, and treated with biuret or tannin. He prefers, for decoloration, neutral acetate of lead to animal charcoal, as the latter always retains a small part of the peptones. Search for the Kühne peptone was always without result.

Casts and Urinary Deposits.—Bohland³¹⁹_{May 19, '94} details a method for the preservation of organized urinary sediments, particularly tube-casts. The deposit is obtained by sedimentation or centrifugation, washed with a physiological salt solution, and transferred to Müller's fluid, which is renewed every three or four days. After a fortnight, hardening is completed by absolute alcohol. Epithelium, leucocytes, and casts are readily recognized. A drop is put on a cover-glass, allowed to evaporate, and then stained with Ehrlich's neutrophile mixture. These preparations can be preserved for some weeks. With Weigert's fibrin-stain the author could never demonstrate fibrin in the casts. To the sediment obtained in the same way Smith⁹_{Sept. 7, '94} adds a solution of chloral of 10 or 15 grains (0.65 or 1 gramme) to the ounce (31 grammes). The solution is renewed every twelve hours for two or three times. If the chloral solution be renewed every three or four months such a preparation may be kept for a number of years. Microscopical preparations will remain in good condition for months. The preservative fluid used by T. Harris²_{June 23, '94} consists of a solution of potassium acetate

saturated with chloroform (potassium acetate, 60 grammes— $1\frac{3}{4}$ ounces; chloroform, 10 cubic centimetres— $2\frac{1}{2}$ fluidrachms; distilled water, 1 litre—quart). The author has thus preserved specimens for over two years. For the same purpose Byrom Bramwell ²_{July 7, '94} adds a solution of boracic acid to the urine, collects the sediment and stains with picrocarmine transports it with a fine pipette into a tube three-fourths filled with Farrant's solution, and at the end of three or four days makes permanent microscopical preparations. Radomyski ³¹⁹_{Apr. 7, '94} has found cylinders in the urine by centrifugation, without albuminuria, and considers cylindruria as a precursory symptom of albuminuria. He has never observed it in healthy persons, but only in those showing disturbances of circulation. He regards the cylinders as due to coagulation of the albumin from the blood-plasma. Daiber ²¹⁴_{July 1, '94} believes them to bear some relation to lesions of the urinary apparatus. Aufrecht ³¹⁹_{May 12, '94} is of the opinion that they are formed from the renal epithelium, for the following reasons: (1) there exist in the epithelium hyaline cells, which may leave it and unite to form cylinders; (2) albuminuria may exist without cylinders; (3) cylinders may exist without albuminuria; (4) finally, there are observed in the collecting tubules large cylinders which could not pass through the tubes of Henle.

Danforth ⁹_{Feb. 17, '94} divides cylinder-casts into two classes: (1) those of non-exudative origin, mucous, and containing or not containing cells and crystals; (2) exudative or fibrinous casts, which comprise hyaline, waxy, or amyloid, bloody, granular, and fatty cylinders. Von Jaksch ¹¹²_{June, '94} reports two interesting cases, the first being that of a woman suffering from renal calculus whose urine contained spiral masses about ten centimetres in length, similar to those observed by Leyden and Curschmann in sputum. They consisted of cells from the urethra and bladder, there being a membranous ureteritis due to lithiasis. In the second case there was an abscess of the kidney, and examination of the urine showed albumin, casts, cells from the lesser pelvis, and hæmatoidin. There were also cylindrical masses ten centimetres in length and three or four millimetres in thickness, some white, others red, and consisting of fibrin. These masses were observed in the urine for six days and then disappeared.

Greene ⁹⁹_{May 31, '94} discusses the conditions under which crystalline

deposits form in the urinary tract and their injurious effects upon the kidney. He made 600 analyses of urine for uric and oxalic acids, finding a crystalline deposit in 180 cases, or 30 per cent., with about equal proportions (17 to 18 per cent.) for uric and oxalic acids. Albumin was noted in 105 (or two-thirds) of the cases of crystalline deposit; of this number *néphritis* could be affirmed in only 18 cases, leaving 87 in which albuminuria depended on irritation produced by the crystals on the kidney. Blood was also found in a fourth of the cases in which there was uric acid, and in about a fifth of those with oxalic acid. Sugar existed in a twelfth of the cases of uric acid, but never with oxalic acid.

Acetone.—Conti ⁵⁸⁶_{Dec.7,'93} has studied acetonuria from three different stand-points: in its relations to the urotoxic co-efficient, to surgical operation, and to the physiological state. The urine in infectious conditions is usually very toxic and contains a large quantity of acetone, though there is not a strict direct relation between the toxicity and the acetone. Operations are frequently followed by acetonuria, but, contrary to what has been claimed, this is not the result of opening the peritoneum or of the use of sublimate. It also causes no pathological reaction. Though traces of acetone may be met with in normal individuals, this is not always the case, and it cannot, therefore, be considered as a necessary product of metabolism. Pittarelli ¹⁰²²_{Nos.16,17,'94} recommends bichloride of mercury as a reagent for acetone and albumin, as well as for the estimation of the quantity of glucose and nitrogen present in the urine.

Pigments.—Zoja ¹²⁶_{Apr.15,'94} has studied hæmatoporphyrin and uroerythrin, the latter of which colors the sediment of urates a brick-red, and may be isolated by amylic alcohol after washing the uratic crystals in ice-water, alcohol, and ether, and dissolving them in hot water. It exists in the urine after dietetic troubles. Saillet ⁶⁷_{May 15,'94} has discovered a pigment in normal urine similar to hæmatoporphyrin. Its extraction is very simple and is effected by shaking the urine with two volumes of acetic ether of acid reaction, evaporating, and taking up with sulphuric ether. He gives this pigment the name of "urospectrin," on account of the three different spectra formed by it as a free substance in alkaline and acid solution. In urine treated by acetic ether there remains

a second pigment,—the chromogen of urobilin,—the best test for which is solar light, which has the advantage of dividing the urinary pigments into two tones without at all visibly modifying them.

Priestly ⁹⁰_{Aug., '94} found hæmatoporphyrin as well as other allied bodies to be rather frequent in the urine in a number of diseases, as well as in the normal state, in varying but generally small quantity. It may exist for a long time, as in albuminuria and diabetes, without seriously affecting the general condition. In other cases it is met with at the same time as an extreme exhaustion, which develops rapidly and often becomes fatal. In all such cases the patients were women (with the exception of one tabetic man) with mental disturbance or else decidedly neuropathic. The symptoms may show themselves spontaneously, but, in the majority of cases, the patients had taken sulphonal. The hæmatoporphyrinuria of sulphonal has the peculiar characteristic of occurring almost exclusively in women, although men also use the drug; it follows the use of moderate doses, and large amounts do not cause it in men or in animals. Finally, it does not disappear when the remedy is stopped.

Caporali ⁵⁹⁶_{Aug., '94} reports two cases of hæmatoporphyrinuria in sarcoma of the pleura, and believes that its presence should render the prognosis grave. E. Schultze ⁶⁹_{Feb. 15, '94} has seen serious symptoms occur at the same time as hæmatoporphyrinuria in a patient, aged 54 years, who took, every evening, doses of from 0.5 to 1.5 grammes (7½ to 23¼ grains) of trional. Herting ⁶⁹_{Apr. 12, '94} reports an analogous case in a woman of 36 years who had taken 53 grammes (1¾ ounces) of tetronal in sixty days and immediately afterward 5 grammes (1¼ drachms) of sulphonal and 22 grammes (5¾ drachms) of trional in twenty-four days. She died twenty-six days after the red color appeared in the urine and fifteen days after the last prescription of trional. Müller, of Gratz, ³¹⁹_{July 21, '94} describes the case of a tabetic patient in whom hæmatoporphyrinuria appeared, with grave symptoms, after the use of sulphonal. On account of the great acidity of the urine, he prescribed 5 to 8 grammes (1¼ to 2 drachms) of sodium bicarbonate and 1 gramme (15½ grains) of magnesium carbonate. At the end of four days the urine was neutral and the patient began to recover. Stern, ¹³_{Apr. 15, '94} in the case of a woman who had taken about 150 grammes (4¾ ounces) of

sulphonal and who died in coma, found a true toxic nephritis with extensive necrosis of the epithelium of the canaliculi.

P. Binet ¹⁹⁷_{May 20, '94} found urobilin increased in digestive disturbances, infectious diseases, measles, scarlatina, typhoid fever, and pneumonia, and scanty in uncomplicated diphtheria. He regards the uroerythrin of Zoja as an oxidation product of urobilin. Doses of 0.20 gramme (3 grains) of urobilin per kilogramme ($2\frac{1}{5}$ pounds) of body-weight were not found toxic for guinea-pigs. Mandry ⁹⁵_{V. 45, No. 3, '94} states that there is not an excess of urobilin in normal delivery, but that it is found after obstetrical operations and lacerations of the perineum. It is not present in cases of hæmatocele. He regards it as of little importance in obstetrics and gynæcology. Riva ⁹⁹²_{Aug. 9, '94} rejects both Hayems's hepatogenic theory and the hæmatogenic theory of Mya, and believes that the greater part of the urobilin and its chromogen in the urine are of intestinal origin, but under the influence of modifications in the biochemical function of the liver as yet not understood.

Jolles ⁵⁷_{Feb. 4, '94} recommends the following method for estimating biliary pigments, permitting the measurement of solutions of 0.2 per cent., while that of Gmelin does not reveal less than 4 per cent., and those of Huppert, Hoppe-Seiler, Hilger, and Rosin but 2 per cent.: To 50 cubic centimetres ($1\frac{1}{2}$ fluidounces) of urine a drop of hydrochloric acid is added, chloride of barium in excess, and 5 cubic centimetres ($1\frac{1}{4}$ fluidrachms) of chloroform. It is shaken and left standing for ten minutes, then poured out, and the chloroform heated in a water-bath; 3 drops of sulphuretted sulphuric acid, containing the fourth of its volume of fuming sulphuric acid, are added. The characteristic rings are found at the bottom of the tube. Létienne ³¹_{June 23, '94} gives a review of the various methods of examining for biliary pigments, and P. Binet ¹⁹⁷_{Apr. 20, '94} discusses the subject of indicanuria. Musser and Pearce ¹⁹_{July 21, '94} give the result of their researches on the diagnostic importance of peptonuria and indicanuria. The value of the latter has been contested by many other writers. Djouritch ¹¹⁸_{Feb., '94} regards it of real importance in children. It exists in normal urine, but in such small quantity that indicanuria may be regarded as pathological, especially in children, in whose food there is less nitrogen than in that of adults. Indican being a derivative of indol, indicanuria is particularly met with in cases in which there is an hyperproduction of indol, as in

acute and chronic affections of the digestive tract and in certain acute diseases, such as typhoid fever, pneumonia, severe chorea, etc. It is constant in tuberculosis, with which it is in direct relation,—a fact that may be of great importance in diagnosis. Its explanation in this disease is not easy in the absence of digestive troubles. It may, up to a certain point, be ascribed to profound changes in general nutrition in the course of tuberculosis. Gillet, ⁶²_{Oct., '93} on the other hand, in a study of indicanuria in fractures, arrives at conclusions of a more doubtful character. Boudurant ⁸¹⁴_{Feb. 15, '94} found indican in the urine of patients suffering from mental diseases, but could establish nothing characteristic except that the quantity was twice as great in the acute as in the chronic forms. Beckmann ²¹_{July 28, '94} made extensive researches in cases of suppuration. Except in intestinal affections, he concludes that no other origin can be ascribed to indol. There is no causal relation between indicanuria and suppuration, and the increase of the latter is of no value in revealing a hidden abscess.

Toxicity of Urine.—Lusini ¹¹⁴⁷_{Nos. 19-21, '93, '94} has studied the effects of normal urine when applied directly to the heart of the frog or the toad, comparing it with that produced by the urine of jaundice, diabetes, tuberculosis, nephritis, scarlet fever, and pneumonia. He concludes that normal urine always causes an increase in the heart-beats, and that morbid urine produces toxic effects directly proportional to the increase of urea, salts, coloring matters, etc., as well as to the abnormal matters. The urine of infectious diseases is far more toxic than that of other ordinary diseases due to leucomaines. Slosse ⁸⁶⁸_{May 19, '94} gives a complete review of the subject, and, with Godart, ⁸⁶⁸_{Aug. 25, '93} has studied the toxicity in dogs deprived of the thyroid gland, arriving at uncertain results, which are attributed to the insufficient method now in use for determining the urotoxic co-efficient. Lapique and Marette ¹⁴_{July 25, '94} find that the physiological variations of urinary toxicity are difficult to influence, and that they increase on the third day of an exclusive milk diet.

Griffiths ²⁰⁰⁰_{V. 19, '91, '92} extracted three ptomaines from the urine in scarlatina, diphtheria, and mumps, and another in uterine cancer, not found in normal urine. With Ladell, ⁹_{Aug. 11, '94} he describes a ptomaine isolated in the urine of influenza the formula of which is $C_9H_9NO_4$. Roger ¹⁴_{June 20, '94} employed dialysis to separate the urinary

poisons. The matters which dialyze (salts, urea, and coloring matters) are not toxic; those which remain upon the membrane are from two to ten times more toxic than the urine itself; the substances which do not dialyze, therefore, are partly neutralized by those which dialyze. The matters which do not pass through the dialyzer cause hypothermia, and may comprise from 6 to 7 per cent.; those which dialyze are thermogenic (from 1° to 1.5°). Albu⁴_{Jan. 1, '94} has made researches on the toxins in the urine of acute infectious diseases (diphtheria, scarlatina, facial erysipelas, pneumonia) and was able to isolate crystalline bodies the chemical and biological reactions of which he indicates with great care. He concludes that these ptomaines, extracted in cases of the same febrile affection, have different physical and chemical characteristics, and that nothing precise can be said as to their nature or pathogenic rôle; they are perhaps only products of nutrition rendered hyperactive by the fever. Jawein⁵⁰_{Feb. 5, '94} has made similar researches on the urine of animals rendered ill by intra-peritoneal injections of various infectious micro-organisms (Fraenkel's diplococcus, pyocyanus bacillus, streptococcus, etc.), and found toxins only in cases where the micro-organisms themselves were met with in the urine. He also doubts the secretion of these toxins by the kidney. Piccini and Conti,¹²⁶_{Apr. 15, '94} in ten cases of anæmia, found the urotoxic co-efficient to vary greatly, but to be always inferior to that observed after recovery. Spallaci⁹_{May 12, '94} states that in cases of constipation lasting from seven to eleven days the urinary extracts cause stupor, weakness, trembling and tetanic contractions, and death by hyperthermia, these phenomena not being produced in the absence of constipation. Ewald and Jacobson⁴_{Jan. 8, '94} examined the urine in several cases of chronic disease, among them three cases of gastric cancer, one case of uræmia, one each of Addison's disease, peritoneal tuberculosis, polyneuritis, and traumatic neuritis, finding toxins in only two of the cancerous cases, in the uræmic case, and in Addison's disease. Frenkel,¹⁴_{Nov. 29, '93} from the fact that injection of urine sometimes determines anuria, believes that there exists in certain urines an antidiuretic substance.

Hæmaturia.—Gumprecht³⁴_{Aug. 7, '94} expresses the opinion that examination of the red globules may sometimes be of service in determining the point of origin of hæmaturia. From an examination of 23 cases he states that the red cells have undergone

fragmentation when the blood comes from the kidney, and are intact if it come from the bladder. The destructive action is exercised by the urea, which is more concentrated in the kidney than in the bladder, while a solution of urea in a physiological chloride-of-sodium solution has the same action. Experimentally a traumatic hæmorrhage of the kidney is accompanied by fragmentation of the globules, which remain intact in induced vesical hæmorrhage.

Rho⁵³¹_{Sept., '93} reports an interesting case of intermittent hæmaturia, the attacks being separated by several days or several months, each lasting from several hours to fifteen or twenty days. They followed fatigue or emotion and were preceded by a painful spasmodic sensation. Twice the hæmaturia was replaced by epistaxis. The author diagnoses the case as hæmaturia of neuropathic origin through paralysis of the vasomotor of the cystic veins. A case of intermittent hæmaturia, lasting from the age of 5 years, is reported by Troitzky⁵³⁰_{No. 20, '93} in a man who had had syphilis and malaria. The attacks of hæmaturia at first coincided with the attacks of intermittent fever.

Outten³⁶⁴_{Jan. 15, '94} enumerates the etiological conditions of hæmaturia, considering especially injuries of the kidney. He states that traumatic hæmaturia is rarely followed by nephritis. In the discussion of his paper Jacobson advised, as a diagnostic measure, the instillation into the bladder of several drops of an iodide-of-potassium solution. If there is a solution of continuity in the vesical mucous membrane the iodide will appear in the saliva in a few minutes. Handford²_{Dec. 16, '93} cites the case of a patient suffering from hæmaturia due to the bilharzia. He had left the Cape of Good Hope eight years previously, and had since lived in England or the northern part of the United States. The parasites must, therefore, have reached the age of 8 years, unless it be admitted that they have the power of reproduction in the human organism without an intermediary host. Leedom¹⁹_{Jan. 20, '94} cites a case of hæmaturia associated with retention of urine, and Collier³²_{Mar., '94} a case in which there was also a generalized cystic degeneration of the kidneys.

Whittaker,⁹_{Jan. 5, '94} in a doubtful case of hæmaturia, examined the blood of the patient, and, finding the parasite of malaria, administered quinine with success. Jones²²⁴_{Apr. 21, '94} altogether rejects the

use of quinine, and praises calomel, to which he adds salol, with Dover's powder or ergotol. Draper⁷⁷¹_{July, '94} gives calomel, nitrate of potassium, and digitalis as diuretics, and sulphophenate of sodium as an antimalarial agent, and attributes great importance to subcutaneous injections of strychnine and atropine. Oates¹⁴³_{July, '94} recommends phosphate of sodium and Fowler's solution. Guice has⁸¹⁴_{Sept. 1, '94} obtained good results from sulphate of quinine, but believes that still better results might be obtained by the following plan: Give, every four hours, 10 drops of turpentine to arrest the hæmorrhage; administer sufficient sulphate of magnesia to produce six copious stools; give liquid nourishment, with 4 drops of tincture of chloride of iron every four hours; combat the malarial element by Fowler's solution.

Hæmoglobinuria.—Krogius and von Hellens,¹²⁶_{July 16, '94} in the course of an hæmoglobinuric epizootic in oxen, observed, in the blood, parasitic corpuscles analogous to the plasmodium of malaria, and which should be classed among the protozoa. These parasites, of varying forms, were attached to the red cells, either singly or in groups, and, on being detached, floated in the serum. The number of cells thus affected was from 7 to 15 per cent., but in severe cases reached 30 per cent. Potain⁴⁵¹_{Nov., '93} regards the prognosis as grave in hæmoglobinuria. Chvostek,⁵⁷_{June 17, '94} basing his theory on the fact that nitrite of amyl will arrest the attacks, states that there is constriction of the peripheral vessels, with destruction of globules in the central organs. L. Dickinson²_{May 18, '94} narrates three cases of transient hæmoglobinuria from muscular exertion. In two the cause was a foot-race; in the third, a game of lawn-tennis. The blood was healthy, but the corpuscles were destroyed by some product of the unusual muscular exertion, probably carbonic acid. A case is reported by D. Parry,²⁶⁹_{Mar. 16, '94} and another by Gubarew²¹_{June 9, '94} in a syphilitic. Sharp and Summerskill observed⁶_{Dec. 9, '93} a case in a girl of 8 years. She had dyspnœa; the face was puffed out; micturition was frequent, but the quantity of urine did not exceed 6 ounces (186 cubic centimetres). The onset was rapid and dated back two days. The urine was chocolate-colored and contained a coffee-colored sediment; there were no casts, but few red corpuscles, and an abundant deposit of amorphous hæmoglobin. The patient recovered in three days. The authors attribute the attack to sewer-gas. A case observed by

Flensburg ⁹⁹⁶_{Jan. 25, '94} was also in a child of 8 years, suffering from congenital syphilis and convulsive paroxysms. During these attacks the serum contained no dissolved hæmoglobin. If the bandaged arm were immersed in melting snow for five minutes, blood appeared in the urine at the end of an hour. Mercurial frictions caused an increase of one million of the red corpuscles, and the hæmoglobin passed from 70 to 105 per cent. The child no longer suffered from attacks after exposure to cold.

DIABETES MELLITUS.

By R. LÉPINE, M.D.,

LYONS.

GENERAL CONSIDERATIONS ON GLYCOGENESIS.

F. W. Pavy, of London, ²⁰²⁰₉₄ has condensed, in his important work, the results of researches carried out by him with great perseverance during a period of nearly forty years. Having summarized the state of our knowledge as regards the carbohydrates and the combinations of phenylhydrazin with sugar (discovered, as is known, by E. Fischer), the author discusses the transformation which the carbohydrates undergo by hydration and dehydration; the first familiar, the second but little known. He gives his personal ideas as to the constitution of proteid matters, which he regards as glucosides. Landwehr has already shown that mucin may yield a non-deoxidizing carbohydrate (animal gum), the composition of which is $(C_6H_{10}O_5)_n$, and convertible into deoxidizing, but not fermentable (gum) sugar, having for its composition $(C_6H_{12}O_6)$. According to Pavy, all proteid matter treated by concentrated potassium yields sugar alike, the quantity increasing if the contact with the potassium is prolonged. For instance, in treating with potassium 1000 parts of dry muscle, previously diluted with alcohol, he obtained a reduction of copper oxide, expressed in glucose by the following figures: Immediately after boiling with potassium, gr. 35.6; three days later, gr. 41.8; six days later, gr. 58.1; ten days later, gr. 59.2. It is thus seen that contact with the potassium for several days increases the deoxidizing power. The matter obtained is apparently resinous and soluble in water, is not colored by iodine, possesses no deoxidizing power, and is precipitated by strong alcohol. When treated by acids it acquires, like Landwehr's gum, a reducing power and yields crystals with phenylhydrazin. In pursuing his researches Pavy found that it was not necessary to first treat the proteid substance with potassium, but that it was sufficient to submit it to the

action of sulphuric acid in a strength of 10 to 100 to obtain a reducing sugar, giving, with phenylhydrazin, crystals of osazone. The same result is attained by the ferments; egg-albumen, when purified, yields, after digestion with pepsin, a product, forming, with phenylhydrazin, crystals of osazone.

Pavy gives his method of extracting from the organs or the blood the sugar or sugars and carbohydrates contained therein. It consists essentially in diluting the blood or the organ with alcohol, which removes the glucose matters, and treating the clot with potassium-water to extract non-glucose carbohydrates, transforming the latter into glucose by diluted sulphuric acid. The alcoholic solution containing the pre-existing sugars being evaporated, these matters are again taken up by the water and the reducing power is determined in one portion of them, while diluted sulphuric acid is added to the second portion, in which the reducing power is much greater. From this it is concluded that the alcoholic solution contained a sugar with a smaller reducing power than that of glucose. This is the method systematically followed by Pavy.

He ascertained positively that all the sugar in the blood of the portal vein is not in a state of glucose; in a dog fasting for forty-eight hours this blood had a reducing power which, expressed in glucose, was, before the treatment by SO_4H_2 , gr. 0.580; after the treatment by SO_4H_2 , gr. 0.643,—a difference of 10 per cent.

In animals submitted to an amylaceous diet the difference was still greater, being 20 per cent. either in the dog or the rabbit. The same was the case after the ingestion of maltose; while after the ingestion of cane-sugar only glucose was found in the blood of the portal vein. According to Pavy, the blood of the greater circulation contains only glucose; while the different organs contain, besides glucose, a sugar having a smaller reducing power. Let us first examine the liver. Taken at the moment of death and placed on ice, it contains scarcely 2 grammes (31 grains) of sugar-substances; but a difference of 12 per cent. appears between the result given by Fehling's solution and that obtained by submitting to the action of sulphuric acid the sugary liquid extracted from the liver. If we wait several hours, the sugar will reach 30 grammes (1 ounce) and more. Here again there is a difference between the immediate estimation and the estimation

after treatment with sulphuric acid, but the difference is less. If, following the example of Claude Bernard, the liver be washed by means of a stream of water introduced through the portal vein, a further production of sugar will be observed. According to Pavy, the kind of sugar formed varies; if the liver be rich in glycogen, it has a feeble reducing power; if it be poor in this substance, the sugar, formed in naturally-smaller quantities, has a greater reducing power. The addition of blood to the washed liver increases the amount of sugar produced, though it cannot be said to influence its nature. A strange fact is that, if the liver be macerated and treated with alcohol, the alcohol afterward removed, and the residuum treated with water at a gentle heat, this latter will be found not to have completely lost its sugar-forming capacity. The addition of sodium carbonate diminishes this power, without influencing the nature of the sugar; the addition of citric acid slightly increases the reducing power of the sugar formed.

If 1 kilogramme ($2\frac{1}{5}$ pounds) of muscle be treated by alcohol, a reduction equivalent to at least 1 gramme ($15\frac{1}{2}$ grains) of glucose is obtained; sulphuric acid increases the reduction in a very perceptible manner,—from 20 to 40 per cent., according to the muscles treated, and even more in the muscles of cold-blooded animals. The same is the case with the spleen, kidneys, pancreas, lungs, brain, placenta, etc. The difference in the figures before and after the use of the sulphuric acid is especially noticeable in the case of the pancreas and the liver. In the fresh egg, the reducing power of which is generally equal to more than 2 grammes (31 grains) of sugar, the difference is nothing; the egg, then, and especially the white, contains only glucose. The development of the embryo exercises an undoubted influence, producing a rapid diminution in the glucose and the appearance of a sugar of feeble reducing power.

As to the hepatic glycogen, the results of Pavy do not differ from what is generally admitted; but the figures which he gives for the other organs—of the glycogen and carbohydrates obtained by separation of the proteid matters—require a detailed relation, although the author admits that they are not perfectly exact, since, in order to obtain the maximum of the carbohydrates, it is necessary to allow the organs to remain in a state of maceration for several days in a 10-per-cent. solution of potassium, and then to

treat the filtrate with a 10-per-cent. solution of sulphuric acid. This he has not done, as a rule. As regards the blood of the general circulation, he has not found that alimentation has any influence upon it. This is not the case with the blood of the portal vein, however, which, after alimentation rich in carbohydrates, contains more than a third more amylose, the average being slightly more than 1 gramme ($15\frac{1}{2}$ grains) per thousand (1 quart) of blood.

If we add that the normal urine contains, according to Pavy, sugar discernible in the state of osazone crystals, we will have exhausted the important facts contained in this valuable work. As to his conclusions, they are the same as those formulated by him long ago. In his opinion the liver stores up the carbohydrates more than do the other organs, and, during life, does not contain more sugar than the others. In diabetes it loses its property of arresting these carbohydrates. The sugar disappears from the blood (1) by transmutation, (2) by entering into the composition of proteid matters, and (3) by becoming transformed into fat.

1. The action of living cells is to dehydrate sugar. Thus, the sugar contained in the juice of plants is transformed into cellulose, starch, inulin, etc. In animals the sugar is converted into glycogen, and it must be understood that the hepatic cells do not monopolize this power of transmutation, but that it is shared by the protoplasm in general. The sugar may also be modified without being converted into glycogen; for instance, Pavy injected pure glucose into the jugular vein and found in the urine a sugar having a deoxidizing power inferior to that of glucose. The same results were obtained by him by injecting under the skin of rabbits 1 gramme ($15\frac{1}{2}$ minims) of glucose per kilogramme ($2\frac{1}{5}$ pounds) of body-weight.

2. There are incontestable facts to prove that the carbohydrates are utilized in the vegetable kingdom for the formation of proteid matter. Asparagin, a crystallizable nitrogenous substance, seems to play an important rôle in this synthesis. In the same way, ammonium tartrate and sugar, when brought in contact with yeast-cells, become transformed into proteid matter (for the growth of the yeast); and, in the intestinal tube, sugar and peptones brought in contact with the villous protoplasm are changed

into proteid matter, the peptones playing the same rôle as does asparagin in the plant.

3. The transformation of carbohydrates into fat in the organism has been long proven. Pavy had ocular proof of this in examining the villus of a fasting rabbit and one which had been given oats four hours previously. In the latter the epithelial cells were filled with large, fatty granules.

These three processes, completing the evolution of sugar,—viz., transmutation, formation of proteid matter, and transformation into fatty matter,—may also be altered in diabetes.

Schenck ²⁴⁶_{v. 57, p. 553, '94} has confirmed in the rabbit the fact, already established by Claude Bernard, that the sugar in the blood increases under the influence of previous blood-letting. The amount originally contained being, on an average, 1 gramme ($15\frac{1}{2}$ grains), he found that, if, ten or fifteen minutes after a previous venesection, a second were made, the sugar increased to a not inconsiderable degree (an average of 0.65 gramme—10 grains). This increase was less if two hours were allowed to elapse before the second venesection, and did not occur at all if a certain time were not allowed to elapse between the two venesections. Opening of the abdomen, if done before the first blood-letting, notably increased the sugar in the blood (about 0.50 gramme— $7\frac{3}{4}$ grains), modifying it less if done at the same time. The increase of sugar was less in badly-nourished animals. If the vessels going to the liver were ligatured, the blood of the second venesection was poorer in sugar than the first. The administration of glycerin or ammonium carbonate did not appear to influence the increase of sugar in the blood in the second venesection.

Morat and Dufourt ⁴¹⁰_{Apr., '94} combat the idea—now abandoned, however—that the formation of hepatic glucose depends upon the vaso-dilator nerves. In the experiment of puncturing the floor of the fourth ventricle the effect of the lesion is seen to express itself in two ways,—one, dilatation of the abdominal vessels, the other hyperglycœmia; these two effects, nevertheless, are simply parallel. A proof of this is that excitation of the peripheral border of the great splanchnic nerve—an excitation which restricts the abdominal circulation, instead of increasing it—would be, according to the researches of these authors, followed by hyperglycœmia. It may be remarked, however, that, to judge from the

tracings given in their article, the hyperglycohaemia is not altogether constant; that it is, in fact, rather feeble. The authors believe that, "at least at times, the primary effect of excitation of the nerve would be a temporary diminution of glucose, probably on account of the diminution in the circulation." It may be observed, also, that, if it is proven that excitation of the splanchnic render the intestine anæmic, they have not actually found that it is not accompanied by a vaso-dilator action in the liver itself. A greater value should be accorded to other experiments showing the diminution of hepatic glycogen outside of the liver-circulation. These experiments were performed as follows:—

The animal (dog or rabbit) is curarized to the limit and artificial respiration established. By an opening in the thorax and another in the abdomen, the aorta is tied above the diaphragm and the portal vein, in order to entirely suppress the circulation of the liver. One of the lobes of this organ is tied with a strong ligature, and the abdomen closed. Artificial respiration is then suspended from time to time, in order to excite the medulla by asphyxiation. This excitation necessarily goes to that part of the liver which has been left in communication with the nerves. After a certain time the amount of glycogen in the ligated lobe is compared with that in the rest of the liver. The following figures show the results of the authors:—

	Excited Lobe.	Lobe Not Excited.
Rabbit	1.26	0.91
Dog	2.89	2.21
Dog	1.00	0.29
Dog	4.12	1.61

Basing themselves upon these results, the authors affirm that the destruction of glycogen in the liver may take place without the intermediary of the circulation, under the influence of the secretory nerves.

Cavazzani, ²⁶⁵_{v.8, '94} on his side, has made a somewhat-similar experiment. A dog was killed and a piece of the liver immediately removed and plunged into boiling water. At the same time the celiac plexus was directly stimulated for a quarter of an hour with a Dubois-Reymond apparatus. Another piece of the liver was now removed, and the sugar determined in each of the two portions isolated. A marked increase of sugar was always found in the second sample, thus demonstrating that the hepatic forma-

tion of sugar takes place even when the circulation is completely interrupted and all vasomotor regulations are wanting.

In a second article Morat and Dufourt⁴¹⁰_{July, '94} endeavored to prove that the excitation of the peripheral end of the pneumogastric diminished the formation of sugar in the liver, but *not constantly*, for in several experiments an exactly opposite result was obtained; besides, Arthaud and Butte (see further) some years ago observed hyperglycohaemia consecutive to excitation of the peripheral end of the vagus. As in the preceding experiments, Morat and Dufourt employed curarized dogs, measuring the sugar in the blood, either exclusively in the carotid before and after irritation of the vagus, or in the portal and subhepatic veins before and after excitation of the vagus (two experiments, only, having been made by the latter method). In several experiments they also cut the splanchnic. Altogether, the results were quite contradictory; sometimes irritation was followed by great hyperglycohaemia, —3 or 4 grammes ($\frac{3}{4}$ or 1 drachm) per litre (quart). This the authors endeavor to explain by saying that secretory and antagonistic nerves exist in the trunk of the vagus, going to the liver. On the other hand, recent experiments made by Butte to control the experiments of the preceding authors⁹²⁷_{p. 166} are remarkably clear in their results. They were made upon non-curarized dogs, and exclusively by the following methods: 1. Comparative measurement of the sugar in the blood of a branch of the portal vein and in a subhepatic vein. 2. Faradization for twenty minutes of the peripheral end of the vagus. 3. Immediately afterward estimation of the sugar in the blood of the portal vein and the subhepatic vein. The following are the figures given as the result of four experiments:—

	GLUCOSE PER LITRE (QUART).			
	Before.		After.	
	Portal Vein.	Subhepatic Vein.	Portal Vein.	Subhepatic Vein.
I.	0.82	1.05	0.98	2.42
II.	0.90	1.22	1.19	2.26
III.	0.78	1.00	1.03	2.32
IV.	1.01	1.33	1.36	2.39

It will be observed that, after twenty minutes of faradization, the sugar in the blood is increased in the general circulation, as compared with that of the portal vein, to judge by the increased figures; it will be especially observed, however, that the quantity of sugar in the subhepatic vein is generally more than doubled after

excitation. It is, therefore, impossible to contest the fundamental proposition of the author,—that irritation of the peripheral end of the pneumogastric increases the formation of sugar in the liver.

Lépine and Barral have previously shown that, after section of the nerves surrounding the pancreatic artery in the dog, and especially after prolonged irritation of the peripheral end of these nerves, a marked increase of the glycolytic power of the blood could be observed. Lépine and Metroz⁹²_{p.891} have shown that faradization of the peripheral end of one of the vagus nerves (they experimented with the left) leads to the same result. They have further shown that the glycolytic power of the blood of the pancreatic vein is also increased. These facts leave no doubt as to the origin of the glycolytic ferment in the blood.

E. Kulz and J. Vogel³⁹¹_{v.31,p.109,94} have studied the sugar products of the transformation of starch and glycogen by the human saliva, the pancreatic juice of the dog, extract of bovine pancreas, and vegetable diastase. They prepared the osazones of sugar products according to Fischer's methods, determining the melting-point and the composition in nitrogen, carbon, and hydrogen. The products of digestion of the starch products were found to consist only of isomaltose, a little dextrose being sometimes found. In one of the experiments with human saliva and the glycogen of the muscle of the horse maltose and dextrose were formed, but not isomaltose.

J. Frentzel,²⁴⁶_{B.56,94} contrary to Cremer, has found that xylose does not form glycogen (in the rabbit) and does not even indirectly favor its formation.

Haycraft⁸³_{B.19,94} has confirmed in the rabbit the well-known fact that levulose produces glycogen. A rabbit was kept without food for six days. (At the end of this time one may assume that all the glycogen in the liver would have disappeared.) Then a solution containing 15 grammes ($3\frac{3}{4}$ drachms) of levulose was injected into the stomach. Four hours later the animal was killed. A large quantity of glycogen was found in the liver. In four other rabbits the experiment was repeated. They were kept for seven days without food. Two were then killed, and to the other two were given 15 grammes ($3\frac{3}{4}$ drachms) each of levulose, and both were killed four hours later. No glycogen was found in the liver of the first two rabbits, but it was present in the liver of the two which had received the levulose.

Livierato ¹¹⁶⁷_{V.32, No.3, '94} has studied the quantitative modifications of glycogen in the blood, as Gabritschewsky did a couple of years ago. The examination of the blood was made under the direction of Cabitto. The following are their conclusions: Glycogen is most frequently found, in the healthy man, in the blood, but in small quantity, and independently of the meals. In the pathological state more or less is present, though sometimes there is none at all; in the former case it is met with in the form of extra-globular masses or in the protoplasm of the white cells, which indicates an increase of the glycogen. In pneumonia of the acute type the white cells contain an especially-large quantity. In typhoid fever the extra-globular glycogen increases during the course of the disease, corresponding with the temperature and the gravity of the affection; if there is a pulmonary complication, endoglobular glycogen is most abundant. In pulmonary phthisis the glycogen in the blood is in proportion to the extension of the lesions and the temperature, though less exactly so than in acute pneumonia. In the acute exanthemata during the febrile period it sometimes increases, this increase appearing to be in relation to the leucocytosis. In acute articular rheumatism it is entirely absent, while in cases of multiple suppuration it increases, although the temperature may fall. It increases also in pyothorax. In inflammation of the serous membranes (pleurisy, peritonitis, etc.) glycogen is seldom met with in the blood or is entirely absent, as it also is in hepatic affections and in cardiac disease with dropsy. In one case of diabetes but a small quantity of extra-globular glycogen was found, the amount being in inverse ratio to the amount of glucose in the urine. Endoglobular glycogen is observed in the second half of the ninth month of pregnancy, corresponding with the leucocytosis; in the puerperal state it is found only during the first three or four days. In the cases studied the ingestion of syrup or of peptone did not influence the quantity of glycogen in the blood, but the hypodermatic injection of 0.5 gramme ($7\frac{3}{4}$ minims) of peptone caused an elevation of temperature and an increase of glycogen in the blood. Livierato believes that the glycogen of the blood must originate in the protoplasm of the leucocytes, seeing that most of the patients were upon a diet.

R. Dubois ⁹²⁷_{p.219, '94} has verified the fact, demonstrated by Claude Bernard, that glycogen accumulates in the liver of the marmot

during hibernation and diminishes rapidly on awakening. During hibernation there is but a small quantity of sugar in the arterial blood, and almost none in the venous. The interesting point of his experiments, however, is the variation of sugar in relation with section of the abdominal nerves. After section of the pneumogastric above the diaphragm he observed 2.89 per cent. of sugar; after section of the splanchnic and the abdominal sympathetic chain, 1.49; and, strangely enough, if to these latter sections were added section of the pneumogastric above the diaphragm, the hypoglycœmia was still more marked,—1 gramme ($15\frac{1}{2}$ grains). With the exception of this latter result, the conclusions of Dubois are in perfect accord with those of Butte (see p. G-7). The same may be said of the researches of Dubois,⁹²⁷_{p.172, '94} showing that extirpation of the semilunar ganglion prevents the reheating of the marmot; section of the nerves of the liver does not retard, but even accelerates, the process; it is slowed by section of the two splanchnic nerves, and arrested if, in addition, the sympathetic chain at the level of the semilunar ganglion be cut. By cutting the pneumogastrics at their entrance into the abdomen, the heating of the body is accelerated,—a fact in opposition to Bernard's idea that section at this point increases the glycogen in the liver. [It is known that the inverse is the case when the pneumogastric is cut at the neck.]

Butte⁹²⁷_{p.332, '94} has found, from two experiments (one upon the rabbit, the other upon the dog), that the glucose formed after death is in exact proportion to the quantity of glycogen that has disappeared, and⁹²⁷_{p.337} that the addition of blood to the liver, far from retarding the transformation of glycogen, as claimed by Seegen, in reality hastens it. Further, its presence in the blood causes a portion of the sugar produced to disappear; so that the sugar found in the liver does not represent the total of that formed. The same author⁹²⁷_{p.352, '94} insists that the glycogen in the liver of newborn animals is much more slowly transformed into glucose than in adult animals.

ETIOLOGY.

Grösz⁶²²_{No.37, '92} ³¹⁹_{No.44, '93} has studied the urine of 50 nurslings between the age of 1 day and 4 weeks. This number included 24 healthy children, 1 premature child, 1 case of hydrocephalus, 14 cases of acute and chronic gastro-enteritis, and 10 cases of other

forms of dyspepsia. Among the 50 cases the urine of 10 caused a reduction of Trommer's test with cupric sulphate. In 2 cases the results were confirmed by observations made with the polarimeter. These 10 cases included 7 of aggravated gastro-enteritis which terminated fatally and 3 of mild dyspepsia. It is assumed that the glycosuria was of alimentary origin. Subsequent investigation disclosed the fact that the administration to infants of quantities of milk-sugar exceeding a given amount was followed by a reaction of the urine to Trommer's test. Healthy children bore a larger amount without change in the urine than children suffering from gastro-intestinal derangement. To this fact, and perhaps also to the influence exerted by the bacteria of the intestinal tract upon milk-sugar, it is thought the glycosuria observed in infants with deranged digestion may be due.

Kuhl³⁶⁶_{B.15,p.420,'94} mentions some peculiarities of the disease in children. In childhood it occurs much more frequently in girls than in boys, while in adults the opposite is the case. Heredity plays a very important rôle. The parents were either diabetic or neurotic. Quite often traumatism was the cause. In children the amount of sugar found in the urine is always considerable, and the prognosis is always unfavorable. The course of the disease is much more rapid than in adults. The younger the patient, the more rapid may be the change from a mild to a severe form of the disease.

R. Broadbent⁶_{Sept.15,'94} reports the case of a girl of 4 years affected with diabetes following influenza. Up to the period of the disease in question the child had always enjoyed perfect health. George Phillips⁵⁹_{Aug.11,'94} saw a diabetic child of three years, whose three uncles on the maternal side had succumbed to the disease at the ages of 3, 8, and 17 years. The mother sometimes presents symptoms of diabetes.

Goodyear¹⁹_{June 30,'94} observed diabetes in a child consecutive to a fall. The disease was insidious in onset and was only recognized by the fact that the child urinated twenty times during the night. Death occurred four months after the fall. L. Bayer, of Brussels, reported⁵⁹_{Apr.21,'94} a case of glycosuria accompanied by other trophic symptoms which was caused by nasal obstruction, and disappeared after the re-establishment of free respiration through the nose. From this observation he came to the conclusion that an obstruc-

tion to nasal respiration may be a direct cause of glycosuria. The appearance of the glycosuria under such circumstances may be explained in part by the diminished absorption of oxygen, but especially by the resulting circulatory (asphyxic) and nervous (bulbar) troubles.

Bolye Chunder Sen ²⁰⁶_{July, '93}; ²_{Oct. 21, '93} contributes a very interesting paper on the great and increasing prevalence of diabetes mellitus among educated Bengalis. He shows that the malady is very much more common among the Hindoos than Mohammedans,—in the proportion of about fifty to one; that up-country Hindoos are comparatively exempt from the disease; that the middle classes, who earn their livelihood by brain-work, suffer in much higher proportion to numbers than the laboring classes, and that males are affected to a decidedly greater extent than females. He adduces some statistics, supplied by the health officer of Calcutta, in support of these statements. The figures fully confirm his propositions, all the more in that they err by defect, inasmuch as many deaths really due to diabetes are registered under the diseases (phthisis, carbuncle, pneumonia, gangrene, etc.) by which, though of diabetic origin, death was immediately caused. He compares the Calcutta figures with statistics referring to the mortality caused by diabetes in Paris, England and Wales, and the United States of America, and shows that the Calcutta death-rates from this cause are higher than those of France, Britain, and America, while in each case there is a decided increase in the mortality due to diabetes in recent years. He claims that his tables conclusively prove “that the disease is on the increase throughout the civilized world, and in Bengal to an extent unknown elsewhere.” There can be no question that Sen’s remarkable conclusion is lamentably true, and it is amply confirmed by experience in Calcutta practice. The number of cases met with among educated Bengalis is very considerable, and a great many valuable professional and official lives are yearly cut short by the wasting and exhaustion caused by diabetes or the complications which so frequently occur in its course and are so apt to terminate fatally. Diabetic families are by no means uncommon, for the malady tends to become hereditary, one member after another succumbing to the multifarious phases of the disorder.

Sen attributes the large and increasing prevalence of diabetes

among educated Bengalis to nervous and dietetic influences; among the former he considers infant marriage as tending to nervous exhaustion, and racial deterioration to be a capital factor. He also points to the high educational pressure of the day and the growing struggle for existence among brain-workers as tending materially to nervous waste and debility. Sexual excess is also mentioned as another cause of impairment of vital power. The diet of the classes which are subject to these compromising influences is shown to consist mainly of rice and vegetables, and is sadly lacking in milk, meat, fish, dal, and atta, which supply elements necessary for the maintenance of health under strain, while no care is taken, by means of out-door sports and games and regular exercise, to build up and sustain the physical strength. The excessive use of alcohol is also said to be a common and growing habit.

M. A. Tchistiakoff ⁵⁸⁶ _{Nos. 4, 5; Sept. 1, '94} ² describes in detail an instance of glycosuria occurring in the early stage of syphilis, and rapidly disappearing under the influence of the usual antisypilitic treatment. Reviewing similar cases recorded in literature (Seegen, Servantie, and others), he comes to the conclusion that in the course of the secondary incubation stage of syphilis there may sometimes develop glycosuria of a benign nature, which is characterized by the following clinical features: (*a*) the daily amount of sugar in the urine remains scanty; (*b*) the daily quantity of the urine does not undergo any considerable increase; (*c*) beyond the presence of sugar, the composition of the urine does not show any marked deviation from the normal standard; (*d*) increase of thirst and appetite and emaciation occur within fairly-moderate limits; and (*e*) the disturbance is of a more or less fleeting nature, and may subside spontaneously after the eruption of the initial cutaneous syphilis. The glycosuria seems to constitute a manifestation and result of a perverted tissue metabolism arising in the earlier period of syphilis.

Landon Carter Gray ⁵⁹ _{May 12, '94} insists upon albuminuria and glycosuria, with hyaline casts in the urine (and lithæmia), as occurring in cases of neurasthenia and functional nervous diseases.

W. Dale James ⁶⁹⁷ _{June, '94} reports the case of a medical man, aged 45 years, and an "old psoriatic," who had taken thyroid extract before Christmas without any effect on the disease, probably owing to the small doses swallowed,—one tabloid twice a day. On March 22, 1894, he began taking four tabloids daily, and at the

end of a week complained greatly of depression, with frequent flushings and palpitations. The nervous symptoms increased, and the patient felt and looked a very old man. Before another week elapsed his thirst became unquenchable; the quantity of urine greatly increased, the breathing became embarrassed, the pulse rose to 132 per minute, and the smell of acetone was detected in the breath. On April 4th the urine had a specific gravity of 1032, and sugar was freely found by all tests. The thyroid treatment was at once stopped, and antidiabetic diet adopted. The quantity of sugar decreased daily, and on April 13th none could be detected. The general condition steadily improved, and on April 30th the patient was quite well, except for the psoriasis, which had not improved. Polyuria following the administration of thyroid has been noted more than once; but, as far as the author has been able to ascertain, this is the first case in which glycosuria has been caused by the treatment.

V. Klima¹⁰⁹⁰_{p.266,'93} observed a case of diabetes in a shoemaker, after a driving accident.

Gibier⁹²⁰_{Apr.23,'94} has reported an interesting observation on a dog, in which glycosuria was produced apparently under the influence of psychical excitation. The animal, a female, was ordinarily kept among a number of others, and is described as being of a timid and jealous disposition; the urine was normally free from sugar. But whenever the dog was isolated from its companions it showed great uneasiness and manifested its displeasure by continual whining. After two or three days of confinement sugar appeared in the urine in every instance, immediately disappearing again as soon as the animal was liberated. Glycosuria did not occur when the animal was caged with another one.

Dyce-Duckworth²_{Oct.7,'93} discusses the glycosuria of middle age, coming on in persons inclined to obesity and suffering from mental strain. He remarks that gout is often a factor, as Garrod has already stated, but does not think that the abuse of alcoholic beverages is the principal cause.

Worms¹⁰_{Dec.,'93} states that at Paris diabetes has become very common of late years; the severe form, which alone figures in statistical tables, caused 301 deaths in Paris in 1892 as against 136 in 1883. He has had the opportunity of examining the urine of 100 brain-workers (male) leading sedentary lives, and

found sugar in considerable amount in 7. On the other hand, among 607 artisans and laborers, sugar was not found in a single case. Worms thinks that persons of the former class, however well they may feel, should make a point of having their urine examined from time to time so as to check the disease at the outset.

PATHOGENY.

Weintraud and Laves⁸³_{Aug., '94} studied the respiratory changes in a case of grave diabetes, by means of an apparatus combining the advantages of that of Pettenkofer and Voit and that of Zuntz-Geppert, which was used by Leo. (See ANNUAL, 1893, vol. i, G-12.) The result of their researches confirm fully those of Hanriot (ANNUAL, 1893, vol. i, G-13), that, after the ingestion of glucose, the quotient is not increased. The absorption of oxygen is as great as in a healthy subject. The same authors, in a second memoir, made the same investigations in a dog deprived of the pancreas. The absorption of oxygen and the exhalation of CO₂ remained normal. The quotient, which was 0.87 with a mixed diet before the extirpation of the pancreas, remained practically the same. The ingestion of glucose did not increase it, contrary to what occurs in the normal state; in other words, there was no consumption of glucose. On the other hand, the figures were increased after the ingestion of levulose, proving that, in this case, the levulose is at least partially utilized.

Lépine,⁹²_{p.876,'94} in a report to the Congrès de Médecine Interne at Lyons, gives a summary of the pathogenesis of diabetes mellitus. Having shown the solidity of the theory as to the internal secretion of the pancreas, he proves that the proposition of Chauveau and Kaufmann, that in every case "hyperglycœmia depends upon an increase in the production of sugar," is absolutely untenable. He recalls the fact, pointed out by Hanriot (ANNUAL, 1893, vol. i, G-13) and during the present year by Weintraud and Laves (previously analyzed), that, after the ingestion of glucose, the excretion of CO is not increased in diabetics, contrary to what takes place in healthy subjects, proving that the consumption of sugar is limited in diabetes,—a fact entirely in accord with the diminished glycolytic power of the blood, which has for some years attracted attention.

It is objected that the sugar is not destroyed in the blood, but

in the tissues. Without doubt this is true; but the glycolitic power of the tissues is powerfully aided by the glycolytic ferment furnished them by the white corpuscles. This ferment plays the rôle of a substitute for heat, electricity, etc., in the chemical combination.

Experiments with artificial circulation have also shown Lépine and Barral that the loss of sugar in the tissues is in relation with the proportion of glycolytic ferment contained in the blood.

Lépine then refutes the idea of Arthus, that the ferment is cadaveric,—an idea which is based upon no proof, and which is opposed by the fact that the ferment contained in the blood is in relation with the various forms of irritation to which the pancreas is subjected.

Lépine had previously ascertained that it is augmented by section of the nerves of the pancreas, and especially by faradic excitation of the inferior end of these nerves. He also gives the results of recent experiments made with the collaboration of Metroz, showing that faradic excitation of the peripheral end of the vagus is followed by an increase of the glycolytic power of the blood, and especially of the blood of the pancreatic vein. (See page G-8.)

Besides the diminution of the glycolytic power of the blood, there are many other elements productive of diabetes. Lépine points out, among others, the incapacity of the hepatic cells to transform into glycogen, by synthesis, the sugar circulating in too great abundance in the blood; the too great facility with which they transform glycogen into glucose, principally under a nervous influence; the fragility of the molecule of albumin which, according to the best authorities (Schützenberger; Pavy,—see under “General Considerations”) contains glucose. There are, also, apparently other pathogenic factors, and, according to the predominance of one or the other, the physician has to do with one or the other of the numerous clinical varieties of this disease.

Gustav Bloch,¹¹⁴_{B.22,74} under the direction of von Jaksch, attempted to produce alimentary glycosuria in patients suffering from diseases of the nervous system. The first patient was alcoholic, suffering from Bright's disease with cerebral atrophy. He was given 100 grammes ($3\frac{1}{2}$ ounces) of pure grape-sugar after a

meal, and excreted about 3 grammes (46 grains) of sugar. The second patient, suffering from glioma of the corpus callosum, was given 100 grammes ($3\frac{1}{4}$ ounces) of glucose, and the following day excreted about 0.50 gramme ($7\frac{3}{4}$ grains) of sugar. The third patient was affected with fibrosarcoma of the facial and auditory nerves, with occasional loss of consciousness and vomiting. No glycosuria occurred. In four other cases of cerebral tumor no glycosuria was produced. The results may be summarized as follows: Alimentary glycosuria is a relatively-frequent symptom in patients with cerebral disease; it is, on the other hand, apparently not favored by the cachectic state, diseases of nutrition, respiration, or of the blood. Affections of the liver, which, after those of the brain, would appear to favor its production, did not appear to do so in the cases observed by the author.

Strasser, a pupil of von Jaksch, of Prague, adds his contribution to the knowledge of this subject. ¹¹³
Nos. 28, 29, '04 His researches, like those of his predecessor, Bloch, were made in the following manner: The absence of sugar in the urine of the patients having been ascertained, 100 grammes ($3\frac{1}{4}$ ounces) of glucose were given them, in wine, after meals, and the urine examined one or two hours later. The result was positive in the following cases: 1. Hemiplegia (from cerebral hæmorrhage). The patient eliminated in an hour and a half 1.65 grammes (26 grains) of glucose. 2. Hemiplegia with tremors, 0.4 gramme (7 grains) only eliminated. 3. Syphilitic lesion of the medulla, 0.62 gramme ($9\frac{1}{2}$ grains) eliminated in two hours. The author remarks that alimentary glycosuria appears not yet to have been observed in cases of circumscribed lesion of the medulla. 4. Cerebral softening, 1.68 grammes (26 grains) in 4 hours. 5. Hemiplegia, 1.55 grammes (25 grains). 6. Poisoning by carbonic oxide, with doubtful traces of sugar in the urine upon entrance to hospital. Three days later he was submitted to the experiment, and eliminated 4.2 grammes (63 grains). 7. Nitrobenzol poisoning, with doubtful traces of sugar in urine upon entrance to hospital. Three days later he was submitted to the experiments and 2.2 grammes (33 grains) of sugar were eliminated. In seventeen other cases of various nervous lesions (hemiplegia, cerebral tumor, polioencephalitis, etc.) the result was negative.

According to Munk and Klebs, extirpation of the cæliac

plexus sometimes produces diabetes insipidus, sometimes digestive troubles of various kinds, followed by atrophy of the pancreas; and, according to Lustig, animals deprived of the celiac plexus (dog, cat, rabbit) which do not die of coma in the second or third week present symptoms of transitory glycosuria, but not atrophy of the pancreas; in all animals so operated upon, diabetes may be produced by puncture of the floor of the fourth ventricle, proving that the celiac plexus is not indispensable for its production.

Lewin and Boer⁶⁹_{No.10,'94} have resumed the study of this question, considering especially the relations of lesions of the celiac plexus to Addison's disease, and studying glycosuria only incidentally. They failed to observe the latter (in rabbits). They were careful to separate the small ganglia in the vicinity of the celiac plexus, which previous experimenters failed to do.

Reichel⁸⁴_{No.29 et seq., '94} passes in review the causes of glycosuria. Among the various forms, he states, is admitted a vasomotor form, such as that following puncture of the fourth ventricle. Morphine, chloroform, chloral, curare, strychnine, carbonic oxide, amyl-nitrite, and asphyxia cause glycosuria by inducing hyperæmia of the liver. But the cause of all these glycosurias being, in short, the incapacity of the hepatic cells to retain glycogen, they may, in his opinion, be classified as alimentary glycosuria. [We would recall here that, according to Morat and Dufourt, whose article has already been analyzed, hyperæmia of the liver is a condition parallel to glycosuria, and not bearing to the latter the relation of cause and effect.]

Obici⁴⁷²_{Nor., '93} reports two cases of grave diabetes, at the autopsy of one of which interstitial pancreatitis was found, the pancreas in the other case being perfectly healthy. He also reports three cases of chronic pancreatitis and two of tumor of the pancreas without diabetes.

G. Hoppe-Seyler, of Kiel,³²⁶_{B.52,p.171,'93} reports a case of diabetes mellitus in which the post-mortem showed both macroscopical and microscopical pathological changes in the pancreas. After a careful review of the literature upon this subject the author explains the development of this disease of the pancreas that can lead to diabetes mellitus in the following manner: The pathological process first attacks the arteries; their walls are thickened, their lumen narrowed or altered. In consequence there follows a lack of nour-

ishment in the part supplied, a thickening of the connective tissue about the acini of the gland, with degeneration and loss of glandular tissue. In like measure as these tissues decrease the inter-acinous fat-tissue increases; it increases rapidly till the pancreas reaches a size larger than the normal. The process in the kidney is analogous, except that the adipose tissue is encapsulating rather than interstitial. Thus the pancreas loses its function power in much the same manner as is seen in progressive muscular atrophy, with fatty degeneration. After the pancreas loses its functional power diabetes mellitus comes on.

Steiner⁴_{Jan. 1, 8, '94} reports a case of calculus of the pancreas with diabetes, and another case in which diabetes was due to sclerosis of the organ, the point of departure having apparently been an arterio-sclerosis. David Hausemann, of Berlin,²⁰²²_{'94} states that there is a form of diabetes occurring with and another form without pancreatic lesions. The pancreas may be destroyed by connective tissue or fatty overgrowth, by tumors or by calculi, and diabetes thereby result. In many such cases, however, so much of the pancreatic tissue may be preserved that no glycosuria is induced. The most frequent pancreatic lesion in diabetes is simple atrophy, and this is found in corpulent diabetic patients as well as in the emaciated, but is met with only exceptionally in other cachexiæ. The form of diabetes occurring with simple atrophy of the pancreas may be regarded as genuine pancreatic diabetes, in contradistinction to the forms associated with other diseases of this gland, which present more casual lesions.

Williamson⁶_{Apr. 14, '94} reports 15 cases of diabetes in which autopsy was performed with especial care as regards the examination of the pancreas. The results were as follow: Pancreas normal macroscopically and microscopically, 7; simple atrophy, 2; simple atrophy with slight fatty degeneration, 1; marked atrophy with fatty degeneration, 1; more or less marked cirrhosis, 4.

EXPERIMENTAL PATHOLOGY.

Seelig⁴_{No. 42, '93} confirms the opinion advanced by Minkowski, that glycosuria invariably follows complete extirpation of the pancreas in one stage (in the dog). In one series of experiments the author intentionally allowed a fragment of the pancreas as large as a pea to remain. In a dog thus operated upon 50 grammes (1½ ounces)

of sugar per litre (quart) were found in the urine in the beginning, then a smaller quantity until death, which occurred in about four weeks. In another dog, in which the portion of the pancreas allowed to remain was larger, glycosuria remained purely alimentary for five weeks, when it changed to severe diabetes lasting seven months, glycosuria predominating at the end. The fragment of pancreas was not found at the autopsy. It is probable that the change from alimentary glycosuria into diabetes coincided with the disappearance of the fragment. In another dog a fragment allowed to remain was afterward extirpated. At no time in this animal was glycosuria observed, no matter what was its food. Autopsy showed (with a microscopical examination as control) that the fragment of pancreas was absent, with the exception of an infinitesimal altered portion. The author naturally concludes, contrary to Minkowski, that in certain conditions total ablation of the pancreas is not followed by diabetes, thus confirming the results of Dominici; but he maintains that if the operation be performed in a single stage the diabetes will not be absent, but that when it is done in two stages the vicarious organs have time for development, which is not the case if the ablation is completed in one operation.

Lépine, ²¹¹_{V.17;} ⁷⁴_{p.413,'94} who, in numerous previous experiments, had but exceptionally seen glycosuria fail to appear in dogs deprived of the pancreas in a single sitting (two or three times in one hundred), has determined the cause of the phenomenon. Glycosuria in this case is in relation to the state of nutrition of the animal at the moment of operation. If the animal be well nourished, as is generally the case when it is desired to keep him alive, glycosuria does not fail to appear; if, however, the animal be in a state of inanition, it will not occur during the entire time that he survives the operation, even though the latter be performed at a single sitting.

Thirollox ⁹²⁷_{p.298,'94} has observed, following Lépine, that the suppression of all alimentation for five or seven days before the ablation of the pancreas in one stage prevents the production of glycosuria, the latter occurring only if the animal be fed.

Bedart ¹⁰⁸⁸_{Aug.12,'94} has also found that glycosuria does not follow extirpation of the pancreas in dogs in a state of inanition. He operated on animals which had not been fed for from fourteen to nineteen days and which lived fifty-six, twenty-eight,

and twenty-four hours afterward without any sugar appearing in the urine.

Hedon⁹²⁷_{p.26,'94} shows that preliminary extirpation of the pancreas does not prevent an augmentation of glycohaemia, and especially of glycosuria after puncture of the bulb. The symptom is constant; but, in order to make it clearer, the author advises waiting several days after extirpating the pancreas before puncturing the bulb. The animal is left to fast the day of puncture, and catheterized every two hours before and after the operation. Thus a dog that, before the puncture, excreted by the urine between $2\frac{1}{2}$ and 4 grammes (38 and 60 grains) of sugar every two hours, excreted, one hour afterward, about the same quantity, and two hours later nearly 9 grammes ($2\frac{1}{4}$ drachms) of sugar. The sugar in the blood, which, immediately before the puncture, was 2.8 grammes ($43\frac{1}{2}$ grains) per litre (quart), three hours after puncture reached 3.1 grammes ($47\frac{1}{2}$ grains), while the temperature rose $\frac{6}{10}^{\circ}$ C. (1.08° F.).

Kaufmann⁹²⁷_{p.233,'94} has sought to show, by tying the aorta and the inferior vena cava above the diaphragm, thus isolating the liver from the anterior portion of the animal, that the consumption of glucose in the blood of this anterior portion is essentially the same whether the dog has or has not undergone ablation of the pancreas. However, it is to be noted that, in his sixth experiment, upon a dog with severe diabetes, the consumption of sugar was scarcely a third of what it was in other animals,—a fact which does not support his proposition.

The same author⁹²⁷_{p.130,'94} has confirmed the fact, established two years previously by Lépine and Barral, that the saccharifying power of the blood is diminished in a dog rendered diabetic by ablation of the pancreas, and adds the opinion that, in a dog thus treated, the tissue of the liver has also less saccharifying power than in the normal state.

Kaufmann⁹²⁷_{p.254,'94} has observed that section of the nerves supplying the liver (pneumogastric, phrenic, splanchnic) does not prevent the appearance of hyperglycohaemia, with its usual intensity, after extirpation of the pancreas; while in animals not deprived of the pancreas the complete section of the nerves of the liver is always followed by hypoglycohaemia. These results furnish a proof of the direct inhibitory action of the internal secretion of

the pancreas upon the liver, and show that the hypothesis that this inhibitory action is exercised through the intermediary of the medulla is unnecessary.

Kaufmann⁹²⁷_{p.284,'04} has found (1) that section of the great splanchnics prevents the production of hyperglycohæmia by anæsthetics; (2) that section of the nerves of the solar ganglion going to the liver and pancreas prevents puncture of the fourth ventricle from producing hyperglycohæmia; (3) that this same action does not prevent anæsthetics from causing hyperglycohæmia; and (4) that, after complete section of the nerves of the liver, puncture and anæsthetics can produce glycohæmia (as already seen by Hedon), provided the nerves of the pancreas be intact.

Charrin and Carnot⁹²⁷_{May 26,'04} produced diabetes in the dog by injecting into Wirsung's duct 7 cubic centimetres ($1\frac{3}{4}$ fluidrachms) of diluted culture of the bacillus pyocyaneus.

Gley⁴¹⁰_{p.420,'04} observed, as did Falkenberg, transitory and very slight glycosuria following extirpation of the thyroid gland in dogs. The symptom remains unexplained. Alberto and Emilio Cavazzani¹¹⁶⁹_{No.3,'04} have studied, with the greatest care, the alterations following extirpation of the pancreas in a dog, 3 months old, weighing $3\frac{1}{2}$ kilogrammes (7 pounds). The animal lived seventeen days and was about to die when he was killed. During the entire period of his survival the urine contained from 20 to 50 grammes (5 drachms to $1\frac{1}{2}$ ounces) of sugar per litre (quart). The autopsy was very complete, but only the changes regarded as important will be noted here. A number of sympathetic cells, principally of the celiac plexus, were small in size, separated from their capsules, and vacuolized. They were distinguished from other cells by their greater affinity for the staining material. The nucleus was vesicular. Many cells in the celiac ganglion presented these changes, while in several the protoplasm was fragmentary. There were a large number of globular cells and nuclear hæmatins in the spleen and numerous medullar cells in the long bones, with leucocytes the nuclei of which were in a karyokinetic state,—nucleated hæmatins and giant-cells in large numbers, with a budding nucleus. It is to be noted, also, that the protoplasm of these giant-cells showed concentric granulations parallel with the limits of the cells and especially surrounding the budding portion of the nucleus. The most interesting changes

were observed in the liver. Macroscopically a fatty, irregular condition was apparent, and microscopical examination showed that certain portions of the glandular parenchyma were entirely destroyed, consisting of a sort of residue in which might be recognized with difficulty nuclei which did not readily stain, cellular and vacuolar *débris*, and tiny drops of fat. The authors believe that the portion of the liver thus destroyed corresponds to the distribution of the nerves coming from the altered cells of the celiac plexus.

Hedon and Truc⁹²⁷_{p.241, '94} have found that the aqueous and vitreous humors of a diabetic dog reduce more actively Fehling's solution than do those of the healthy dog.

PHLORIDZIN DIABETES.

Prausnitz³⁹¹_{v.11, p.168, '94} has made two experiments showing that the sugar excreted by a dog to which phloridzin had been given is much greater in quantity than that which might be produced at the expense of the glycogen existing in the economy. In the first experiment he found, by using a control animal, that the quantity of glycogen existing should have been about 100 grammes ($3\frac{1}{4}$ ounces); while the animal to which phloridzin was given, fasting, excreted 286 grammes ($9\frac{1}{4}$ ounces) of sugar, and had still 25 grammes ($6\frac{1}{4}$ drachms) of glycogen in the economy. In the second experiment the total quantity of glycogen should have been 30 grammes (1 ounce); the animal excreted 119 grammes ($3\frac{3}{4}$ ounces) of sugar, and had, at the moment he was killed, 5 grammes ($1\frac{1}{4}$ drachms) of glycogen. However, account must be taken of the amount of sugar introduced by the phloridzin (phlorose); this containing 38 per cent. of phlorose, the first dog received 35 grammes ($1\frac{1}{8}$ ounces) of phlorose and the second 9 grammes ($2\frac{1}{4}$ drachms). With this allowance made, it is still evident that a large quantity of the sugar excreted necessarily came from the albuminoids.

The experiments of Max Cremer and Ritter³⁹¹_{p.256, '94} show a great analogy to the preceding experiments, save that in the latter experiments, also two in number, the animal used was a rabbit, the proportion of glycogen in which is well known, and the phloridzin was not given by the stomach, but injected each day under the skin. The dose used was 3 grammes ($\frac{3}{4}$ drachm) for the first

rabbit and 1 gramme ($15\frac{1}{2}$ grains) for the second. The total amount of nitrogen in the urine was measured daily, and, in a general way, the perfect parallelism of the nitrogen and sugar curves may be said to be notable. An increased excretion of sugar occurred in the second rabbit immediately at the beginning of the experiment, which was due, no doubt, to the glycogen still existing, and which soon disappeared under the influence of inanition. At the end there was an excess of nitrogen in both animals, characteristic of the termination of life. Therefore, as was shown by previous experiments of one of these authors, phloridzin injected under the skin of rabbits appeared unchanged in the urine. There is, then, no necessity to consider the phlorose, and, no part of the sugar found in the urine being derived from phloridzin, there remain but the albuminoids to explain its excretion by the rabbit in a state of inanition.

Baldi,³⁷⁶_{p.1, '94} in experiments upon phloridzin diabetes, obtained results contrary to those of Minkowski, and in accord with those of Cremer and Ritter, that there is no constant relation between the excretion of nitrogen and sugar, and that, consequently, it cannot be admitted that the latter results simply from the separation of the molecules of albumin. He believes that animal as well as vegetable cells may produce sugar by synthesis.

Trambusti and Resti,³⁷⁶_{v.5,6, '94} have made an histological study of the organs of dogs and rabbits rendered diabetic by means of phloridzin. By means of the iodized-gum test hyaline epithelium was found in the convoluted tubules, but no glycogen, the reaction for the latter being only obtained in the vascular walls and the glomeruli. They also noted the existence of glycogen in the leucocytes of the blood. The glycogen in the liver and other organs was not augmented. They attribute acetonuria to lesions of the hyaline epithelium of the convoluted tubules.

SYMPTOMS.

Moritz Borchardt and H. Finkelstein,⁶⁹_{Oct.12, '93} have made an interesting comparative study, in themselves and in a diabetic subject, of the action of carbohydrates upon the disassimilation of proteid matters. In the first experiment all three lived upon a meat diet sufficient to sustain life. Under this regimen the diabetic excreted only traces of sugar. In a second experiment 50 to 100 grammes

($1\frac{1}{2}$ to $3\frac{1}{4}$ ounces) of sugar were added. Strange to say, about 2 grammes (31 grains) less of nitrogen was excreted by the diabetic as well as by the healthy subjects. At the same time the former excreted from 30 to 70 grammes (1 to $2\frac{1}{4}$ ounces) of sugar, and lost within a few days 2 kilogrammes ($4\frac{1}{2}$ pounds) in weight. This experiment furnishes the proof that there is a form of diabetes in which the carbohydrates prevent the disassimilation of proteid matters, but that they are powerless to increase the weight. It may be remarked, also, that in this patient levulose did not act better than grape-sugar.

Fremont²⁰²²₉₄ has found in a number of diabetics, in addition to increase of the products of disassimilation and acidity of urine, a normal co-efficient of oxidation (not proteid matter, which is not extraordinary).

Unschuld⁴_{July 9, '94; Aug. 11}² draws attention to some of the less-noticed symptoms in early diabetes. He quotes a number of illustrative cases in which the disease was masked by the presence of dyspeptic symptoms, nervous symptoms classed as neurasthenia, etc. Sometimes diabetes may quite accidentally be discovered. Here marked thirst and abundant urine were mostly absent. Frequently cramp in the calves is complained of, a symptom at present but little recognized. During the past eight years the author has found it in as many as 26 per cent. of his cases. In 1891 he found it 33 times among 109 cases. It most often occurs in the morning, but sometimes at night. If such cramps occur and the patient complain of weariness and weakness, the urine should be at once examined for sugar. These cramps may be present in all forms of diabetes, except in the acute disease occurring in young subjects. Massage and attempts at walking generally relieve the cramps. The cause is obscure; perhaps it is due to the diabetic toxins. The recognition of these cramps may lead to the early diagnosis of diabetes.

COMPLICATIONS.

Poore²_{May 19, '94} observed a case of enteric fever in a diabetic subject. A man, aged 35 years, was admitted to the University College Hospital, on October 5, 1893, suffering from diabetes of moderate severity, and remained under observation for one hundred and fourteen days, during which one hundred and five separate estimations of the daily output of sugar or urea in the urine were

made. The special interest of the case lay in the fact that while he was thus under close observation he developed (on November 16th) enteric fever, which persisted for six weeks. This attack of fever was without diarrhœa or other serious complications, and might almost be regarded as "simple continued fever." Opportunity was thus offered for observing the effect of the febrile condition on the urinary excreta. During the first week of his stay in hospital, during which the patient was on ordinary full diet, but was taking opium by the mouth, the urine amounted (for the week) to 1218 fluidounces (36 litres), and contained 7900 grains (510 grammes) of urea and 22,218 grains (1432 grammes) of sugar. During the next five weeks the patient remained in his normal (diabetic) condition, and consumed a rigid diabetic diet. For these five weeks the weekly average of urine was 673 ounces (20 litres), containing 6118 grains (394 grammes) of urea and 3781 grains (243 grammes) of sugar. Then followed the period of fever, which lasted for six weeks, and during this period (the average temperature for the whole period being 2.2° F.— 1.2° C.—above the normal) the weekly average of urine amounted to 491 ounces (14.7 litres), containing 4263 grains (275 grammes) of urea and 1214 grains (78 grammes) of sugar. The febrile period was followed by a fortnight during which the temperature was subnormal, and it was found that the weekly average of urine was 644 ounces (19 litres), containing 3577 grains (230 grammes) of urea and 989 grains (62 grammes) of sugar. During the last fortnight of his stay in hospital the temperature was normal, and the weekly average of urine was 537 ounces (16 litres), containing 6105 grains (394 grammes) of urea and 7511 grains (484 grammes) of sugar. These figures showed that, although the urinary excreta were diminished during the fever, the period of their greatest diminution was that of subnormal temperature which followed the fever. This case lent no support to the commonly-accepted statement that during fever the output of urea was increased. Complete disappearance of sugar from the urine occurred on the fifth, sixth, and seventh days after complete cessation of the fever, when the patient's temperature averaged 97.1° F. (36.1° C.). On these three days the urine amounted to 294 ounces (8.8 litres), and contained 1088 grains (70 grammes) of urea and no sugar. The numbers seemed to show that the greater freedom from glycosuria occurred

at a time when the needs of the body were great and the patient was rapidly increasing in weight to replace the 24 pounds (11 kilogrammes) of body-weight which, partly from actual weighing and partly from estimate, it was assumed that he had lost during his six weeks of fever. Poore drew attention to the fact that there was a certain parallelism in this case between the output of sugar and the pulse-respiration ratio, and that as the value of pulse-respiration ratio declined so did the output of sugar. One might from this assume that, as the output of carbon by the lungs increased, the output of carbon by the urine diminished. In conclusion, Poore gave reasons for thinking that the condition of the parotid glands in diabetes had not, perhaps, received sufficient attention either at the bedside or in the post-mortem room.

Loeb⁴¹_{July 30, '94} observed intestinal hæmorrhage in a diabetic patient aged 55 years, not suffering from hæmorrhoids. Mies³⁴_{Aug. 31, '94} found crystals of tyrosin in the urine of a diabetic child of 10 years. Herbert Horden⁶_{Oct. 23, '93} relates a case of pityriasis rubra in a diabetic.

E. Munzer and A. Strasser²⁷³_{V. 32, p. 372, '93} measured the nitrogen eliminated in the urine of three diabetic patients. In one case of coma they found that azoturia was greater during this stage of the disease, attributing it to a greater disassimilation of albuminoid substances. They also observed that the elimination of ammonium was frequently parallel with the elimination of acetone or aceto-acetic acid, the two occurring to a marked degree, even when oxybutyric acid was absent. In consequence, the aceto-acetic acid, as well as oxybutyric acid, may determine the acidification of the organism, and eventually the appearance of coma.

Hirschfeld⁶⁹_{No. 38, '93} states that excretion of acetone takes place even under normal physiological conditions. The quantity, which in pathological subjects varies between 3 and 13½ grains (0.2 and 0.87 gramme) per diem, depends upon the individuality of the patient, and also to a very considerable extent on the nature of the nutriment. Food of an exclusively albuminous nature favors the excretion of acetone. The latter is not affected by the addition of fat, but the introduction of carbohydrates into the nutriment either causes the acetone entirely to disappear or else to diminish very perceptibly in quantity. An addition of 50 to 100 grains (3.20 to 6.65 grammes) of carbohydrates—in the form of starch, cane-sugar, grapes, milk, sugar, manite—either stops the

acetonuria or reduces it to a minimum. A roll weighing $1\frac{3}{4}$ ounces (60 grammes), or nearly 1 pint (0.5 litre) of milk, added to an otherwise albuminous diet, brings the acetone down to $1\frac{1}{2}$ to 3 grains (0.1 to 0.2 gramme). Glycerin has a similarly-marked effect; but alcohol, opium, morphia, antipyrin, and salicylate of soda produce no result. The acetonuria observed in cancer and gastric troubles, which has frequently been described as part and parcel of these maladies, is probably (in Hirschfeld's opinion) explicable on dietetic grounds; for an increase in the carbohydrates injected causes it to subside, just as with healthy persons. It is therefore inaccurate to speak of acetonuria gastrica, febrilis, or carcinomatosa.

In the milder forms of diabetes acetonuria behaves as in the normal subject. In severe cases, in which the organism has lost the power of utilizing the carbohydrates, the latter no longer inhibit the formation of acetone. Metabolism in diabetes, as far as the inhibitory action of carbohydrates on the production of acetone is concerned, is entirely analogous to that of the normal, healthy subject. Prognosis in cases of diabetes mellitus must depend on the proper recognition of two very important symptoms,—the glycosuria and the acetonuria. The latter is of greater importance, since an increase in the secretion of acetone is directly conducive to the production of dangerous symptoms, whilst the injurious results of loss of sugar are indirect and more gradual in their nature. Directly the exhibition of carbohydrates ceases to diminish the excretion of acetone, the meaning is obvious.

Careful observation of the output of acetone is of use as a guide to diet. Of course, experience has shown that continued use of large quantities of carbohydrates aggravates the disease (diabetes); nevertheless, in cases in which the output of acetone is considerable, it is advisable to suspend the regulation dietary for a time and try carbohydrates. Glycerin is an excellent surrogate for the latter, especially when the patient strongly objects to large quantities of food (3 to 6 ounces—93 to 186 grammes—glycerin per diem produce no unpleasant consequences).

Williamson²_{Feb. 24, '94} gives the results of a microscopical examination of the medulla in two cases of diabetes. In both there was sclerosis of the posterior cord, which the author considers as the result of toxæmia. He recalls the fact that similar alterations

were pointed out by Sandmeyer and Leyden in dietetics, and by Minnich in three cases of pernicious anæmia.

Among 131 cases in diabetes mellitus Gröbl¹¹³_{No.2,'94} found the knee-jerks normal in 113 and exaggerated in 5. Three of the latter, however, presented not true diabetes, but merely the glycosuria of neurasthenia, and in them both the presence of sugar in the urine and the state of the reflexes were to be ascribed to the condition of the nervous system. Among the other 115 cases were 9 of the severe type of diabetes mellitus. Of these 9 the knee-jerks were exaggerated in 2, which presented great weakness and in which the urine contained large amounts of sugar and acetone, but in which, as in the course of treatment, the general condition improved, the excitability diminished, and ultimately the knee-jerks became normal. In 4 cases of severe diabetes the knee-jerks were abolished or greatly enfeebled. The knee-jerks were also wanting in 9 mild cases, but in 2 of these posterior spinal sclerosis co-existed, and in a third there was such an excess of adipose tissue as to interfere mechanically with the elicitation of the phenomenon. The knee-jerks were thus lost in 10 cases among 131,—7.6 per cent. It was further found that the knee-jerks may be preserved in the most severe cases, even in the presence of coma, while they may be absent in mild cases in which the sugar can be made to disappear by appropriate diet. It thus appears that symptomatically the knee-jerks have little or no significance, either diagnostically or prognostically.

Jerzykowski⁶_{Sept.30,'93} has published an article on psychical disturbances occurring in patients suffering from diabetes, of which he has observed several cases. In one patient, a man aged 50, there was profound melancholia, with attempts to commit suicide, and in another, an old woman, there was also melancholia. In a third case, that of a widow aged 61, there was also considerable mental disturbance. In none of these cases was there any hereditary tendency to insanity. As another instance of the relationship between diabetes and mental affections, Jerzykowski draws attention to the glycosuria which sometimes occurs after sudden mental shock. With regard to the question whether the psychical phenomena are primary or secondary to diabetes, he maintains that in the large majority of cases they are actual complications of the disease. He states that the most common of these phenomena are

alterations in the intellectual powers, of the special senses, and of memory. Cases of melancholia, such as just noted, are not so often met with.

Leonard Weber, ¹_{Aug. 18, '94}, following Frerichs, insists upon a cardiac diabetic coma, and reports the case of an elderly diabetic woman whose heart, during the last three years of her life, became more and more feeble (24 and sometimes 18 per minute).

Rovere ⁵⁸⁹_{July 6, '94} reports a case of suppurative polymyositis in a diabetic patient. Becker ⁶⁹_{Nos. 16, 19, '94} has seen comatose symptoms follow surgical anæsthesia in three cases of diabetes. In the first case amputation for gangrene of the thigh was performed. Anæsthesia with chloroform lasted thirty-five minutes, and death occurred in coma on the evening of the second day. In the second case ether was used, the anæsthesia lasting an hour, the operation being for an aneurism of the popliteal artery. Death occurred in coma three days later. In the third case coma came on two hours and a half after anæsthesia by chloroform, lasting two and a half hours. Death took place nine hours later.

Marvin ²²⁴_{Nov., '93, Feb. 10, '94} reports the case of a diabetic young man who was submitted to chloroform anæsthesia for an abscess. On his awakening respiration appeared to "be a little peculiar," and death occurred in coma the following day.

Grube ⁷_{Nov. 15, '93} has investigated the condition of the knee-jerk in 184 cases of diabetes mellitus. In general he has used the method recommended by Buzzard, coupled with Jendrassik's re-inforcing device. As only one examination was made in 56 of the cases, he excludes those from consideration. Of the 128 remaining cases, the knee-jerk was normal in 113 and increased in 2. In the latter cases the patients were suffering from a severe form of diabetes; their urine contained large quantities of sugar and acetone, and they were too feeble to walk. Under treatment these patients improved; their knee-jerk then became normal. In 4 cases of severe diabetes the knee-jerk was absent or greatly diminished. One of these patients had bilateral neuritis with trophic derangements. The phenomenon was absent in 9 slight cases. Excluding 3 of these,—because 2 of the patients were tabetic and the third was too obese to admit of satisfactory examination,—there were only 10 patients (7.6 per cent.) in whom the knee-jerk was abolished or much reduced. The author contrasts his results with those

recorded by other writers. Bouchard, who first described loss of knee-jerk in diabetes, found the defect in 36.9 per cent. of cases, Williamson in 50 per cent. Grube concludes that absence of knee-jerk has no prognostic significance in diabetes; in diabetic coma he has seen brisk reaction to percussion of the patellar tendon.

Pryce⁴⁷_{Autumn, '93} publishes three interesting cases of neuritis in diabetes. The first, a man of 56 years, had suffered for some months with pain in the legs, and had Madura foot three months and a half before his death. Walking, which was possible when he was supported, was that of an ataxic. He died in coma. At the post-mortem examination a considerable increase in volume of the inferior third of the posterior tibial artery was visible to the eye. The medulla and peripheral nerves were examined histologically by Bowlby, of St. Bartholomew's Hospital, who found marked atrophy of the cells in the lumbar region, these having become granular and lost their prolongations. The changes were still more pronounced in the dorsal portion of the medulla. In the posterior tibial nerve the sheath of Schwann was replaced by a granular matter which would not stain by osmic acid. A few axis-cylinders were normal, but many were atrophied and in a state of fatty degeneration. The same alterations, but less pronounced, were noted in the anterior tibial nerve.

The second case was that of a man of 72 years, with diabetes and ataxic symptoms. Some time before death there was a complete loss of the knee-reflex. Death took place from gangrene of the lower limbs. The anterior tibial and sciatic nerves presented the same appearances as in the preceding case, but in the posterior tibial they were still more pronounced, and large vascular lesions could be seen. The great thickness of the connective tissue is shown by an illustration. In the third case, a man of 62 years, there were also ataxic symptoms and gangrene, with the same lesions of the peripheral and vascular nerves. The two latter were studied by Ransom.

Reich, of New York,⁵⁹_{Jan. 13, '94} makes a complete report of a case of multiple peripheral neuritis, with atrophy of the superior extremities, without autopsy.

Litten³⁴_{Nov., '93} maintains that diabetic cataract in young subjects may be distinguished by its rapid development (in one case devel-

oping in several hours) and by its appearance (that of steel-gray spots in the cortical layer). He has not seen any results from antidiabetic treatment.

Crisafulli⁵⁸⁹_{May 17, '94} observed a gangrenous ulcer of the prepuce in a diabetic patient, with symptoms of local inflammation, but no febrile reaction.

Reynier¹⁰⁸_{No. 3, '94} calls attention to the different reactive powers shown by the tissues of diabetics to traumatism, infection, or surgical intervention. In some cases operation is as safe as in the ordinary healthy being; in others the least surgical interference results fatally. Diabetes associated with extensive atheroma is, according to the author, the safest form of the disease for the surgeon. The nervous, or pancreatic, form of diabetes is the most dangerous form. Also, as diabetes progresses, tissue-resistance is lessened; hence, intervention is safer in the early period of the disease than when it is well developed. Only absolutely-necessary intervention should be practiced when the disease has reached such a stage that the reflexes are abolished. Any form of irritation may precipitate sphacelus, which is practically always threatening. Carbolic acid and all dressings which are in the least irritating are contra-indicated.

When gangrene has developed without inflammation, absorbing powders, such as salicylate of bismuth and iodoform, are useful.

There are two classes of surgical affections which may be subject to operation in diabetics who still preserve their reflexes. These are neoplasms and spontaneous infectious lesions. The removal of neoplasms should be avoided unless it is absolutely necessary. Most rigorous asepsis is required, as the slightest germ-infection will certainly be followed by disastrous results. Antisepsis is contra-indicated because of the irritative qualities of the drugs employed. Even should the reflexes be preserved, operation should not be undertaken if the amount of sugar is more than 15 or 20 grammes ($3\frac{3}{4}$ or 5 drachms) daily. Preceding operation a rigorous course of general treatment should be instituted.

In spontaneously-infected cases three indications should be met: to avoid irritation, to limit infection, and to provide for free drainage, since there is practically not sufficient reactive power for absorption. This implies prompt incision of suppurating foci; the

thermo-cautery or galvano-cautery may be employed, since thus opening of the vessels is avoided and hence the danger of propagation of infection is lessened. Generally the less the wound is interfered with, the better for the patient.

Of 40 diabetics operated on by the reporter, 15 died from gangrene or allied conditions. Of these 15 cases, 2 only preserved their reflexes at the time of operation. Of the remaining 25 cases, 3 died and 22 recovered.

Thelen ³¹⁹_{Dec. 5, '94} insists upon the importance of antidiabetic treatment in the surgical diseases of diabetes, even when the latter itself does not appear to be influenced by such treatment.

PROGRESS.

Worms ¹⁰_{Dec. 5, '93} reports several cases of diabetes of slow evolution, the disease dating back as far as twenty years in some of the patients. He also insists upon the frequency of latent diabetes in men given up to intellectual work. Of one hundred persons belonging to this category, he found sugar seven times, although no symptoms had occurred to call the attention of the individuals, who did not know themselves to be affected. According to this author, diabetes of slow evolution may be ranged under three heads: (1) easily reducible, (2) irreducible, and (3) periodic. [Intermittent would be preferable.] Diabetes of the first type is well known to clinicians as mild diabetes. That of the second type is less known, and, according to Worms, may be latent; generally the patient knows himself to be diabetic, but continues to enjoy good health if the quantity of sugar do not exceed 15 to 20 grammes ($3\frac{3}{4}$ to 5 drachms) daily, and if the polyuria and azoturia are but slight. There is at times an extraordinary variation in the quantity of sugar excreted in the morning and the evening (from 10 to 60 grammes— $2\frac{1}{2}$ drachms to $1\frac{3}{4}$ ounces). This form is, besides, not absolutely irreducible, as by Cantani's treatment (meat diet) the sugar may be made to disappear temporarily from the urine. The result, however, is known to be unfavorable to the general health, the patients becoming at least dyspeptic, and sometimes liable to fall into a state of coma.

Intermittent diabetes may exist with or without azoturia. Worms recalls the case of a cashier who had been affected with diabetes for eighteen years, but for some months had been free

from glycosuria, and in whose urine one morning 55 grammes ($1\frac{3}{4}$ ounces) of sugar per litre (quart) were found. The patient had dreamed the night before that the cash with which he was charged had been stolen. Handford ²_{Oct. 7, '94} has seen cases of acute or chronic diabetes meriting rather the name of glycosuria. In one case, for example, glycosuria had existed only during the course of typhoid fever.

Kallay ⁴¹_{No. 43, '93} distinguishes two forms of diabetes,—primary and secondary. As a remarkable example of the former, he reports the case of a man of 44 years, weighing 156 kilogrammes (343 pounds), who arrived at Carlsbad, with 100 grammes ($3\frac{1}{4}$ ounces) of sugar per litre (quart), almost in a state of coma, and with fever (39.3° C.— 102.6° F.). Submitted to an absolute anti-diabetic diet and Carlsbad water, he had, at the end of five days, but 50 grammes ($1\frac{1}{2}$ ounces) of sugar per litre (quart), and at the end of ten days hardly any. Four weeks later he left Carlsbad, apparently cured. Twelve years passed. From time to time the patient had 15 grammes ($3\frac{3}{4}$ drachms) of sugar per litre (quart), but this slight glycosuria always disappeared after a course at Carlsbad. Another grave case was that of an American journalist of 37 years, as thin as a skeleton, who appeared to be in a state of lethargy when first seen by the author. The urine contained 70 grammes ($2\frac{1}{2}$ ounces) of sugar per litre (quart). Owing to the weakness of the patient it was impossible to enforce a severe diet, and he was allowed to eat. The sugar disappeared but slowly, and in several weeks had fallen only to 17 grammes ($4\frac{1}{4}$ drachms) per litre (quart). Even after ten weeks it did not drop below this figure, though an antidiabetic diet was followed.

TREATMENT.

Bohland ¹¹⁶_{Aug., '94} has experimented with levulose in two cases of diabetes. In the first case the use of 20 to 30 grammes (5 to 8 drachms) increased the amount of sugar excreted by 20 to 30 grammes (5 to 8 drachms) on certain days, while on others less sugar appeared in the urine. [It was not determined whether this sugar was glucose or levulose.] In the second patient 20 to 40 grammes (5 to 10 drachms) of levulose never increased the amount of sugar excreted. The author remarks that not only in diabetic but in healthy persons is the effect variable after the use of levulose.

J. B. Haycraft ⁸³_{B.19,H.2,94} records the results obtained in three cases of diabetes by giving levulose as a carbohydrate food. The patients were placed on a fixed diet, from which the carbohydrates were excluded as far as possible, and the sugar estimated in the urine. In alternative periods of three days, 55 grammes ($13\frac{1}{2}$ drachms) of levulose were given per diem in six doses. The quantity of sugar excreted was determined by Fehling's solution and by polarization.

In the first case (one of acute diabetes) the average increase of sugar-excretion in the urine produced by the administration of levulose was 106 grammes ($3\frac{1}{2}$ ounces) for the period of three days. During this period the patient had taken $55 \times 3 = 165$ grammes ($5\frac{1}{2}$ ounces) of levulose. Of this 9 grammes ($2\frac{1}{4}$ drachms—5 per cent.) were excreted again as levulose; 97 grammes ($3\frac{1}{8}$ ounces—59 per cent.) were excreted as glucose; 59 grammes (2 ounces—37 per cent.) remained in the organism. Similar results were obtained in a second case of acute diabetes.

In the third case—one of chronic diabetes in an old person—all the levulose taken was utilized in the organism, and there was no increase in the glucose excreted.

From the above observations the author draws the following conclusions: 1. A patient suffering from chronic diabetes can utilize 50 grammes ($1\frac{1}{2}$ ounces) or more of levulose daily. 2. In some acute cases a part of the levulose taken with the food is excreted as such, a part is utilized in the body, and a part is transformed into glucose.

W. Hale White ⁴²⁸_{v.1,p.133,93} records the result of a number of careful experiments on eight diabetic patients, with regard to the effect of giving levulose and inulin. Levulose prepared by von Schering was employed, and inulin, in the form of dahlia-tubers, was given. The following are the conclusions at which he arrives:

1. If large amounts of levulose are given, some of it appears in the urine.

2. In none of these cases did levulose have the pernicious effect, often seen with ordinary carbohydrates, of increasing the output of sugar beyond the extra quantity given.

3. When levulose is given the excretion of sugar is usually increased, but it may be diminished.

4. In most cases much less sugar is passed in the urine after

giving levulose than would have been excreted if the previous excretion of sugar had remained stationary, and all the levulose had appeared in the urine. This result seems to indicate that in these cases some of the levulose given was retained and used up in the body.

5. There is some evidence that the larger the amount of levulose, the less will be the increase of sugar in the urine.

6. While, therefore, some of these cases show that levulose can be utilized better than dextrose, none of them show that dextrose can be utilized better than levulose.

7. None of the patients felt worse for taking levulose; indeed, some felt better and gained in weight.

8. Probably a moderate amount of dahlia-tubers, taken as a vegetable by patients suffering from diabetes, would do no harm.

9. The effect of levulose on the excretion of urea is unimportant.

10. The amount of urine passed when levulose is given varies with the quantity of sugar passed.

Grube⁶_{Dec. 30, '93} is, like most practitioners, in favor of the administration of carbohydrates when coma is threatened. Bickle⁸¹⁴_{Dec., '93} publishes several cases of diabetes, three being of a severe form. One of the latter was a woman of 67 years, unconscious, with delirium, subnormal temperature, irregular pulse, and respiration sometimes stertorous. The author administered oxygen by inhalation, and on the following day consciousness returned.

Forlanini, Cavallero, and Riva-Rocci⁹⁹⁷_{Dec., '93} tested the effect of compressed air in three severe cases of diabetes. The patients were first submitted to a mixed diet, then to an absolute meat diet, the weight of the patient, as well as the food, being ascertained. For four or five days they were given a pneumatic bath, at the ordinary pressure, for ten hours daily, and were then submitted to superpressure for ten hours daily. From the tables given by the authors, it appears (1) that organic exchange was increased; (2) that the compressed air determined no stimulating action, either by expression or by increase in the consumption of organic matter or in circulation; (3) that, though oxidation was not increased by the pneumatic bath, it was rendered more complete, and the toxic substances resulting from increase of nitrogenous exchange were destroyed. The amelioration of the diabetic

syndrome does not depend upon a variation in the CO exhaled, but upon better oxidation, a diminution in the toxic products, and a better utilization of material. Without pronouncing upon the therapeutic value of compressed air, the authors conclude that it is of value in combating the chemical disorders resulting from diabetes and in diminishing the inconveniences of an absolute meat diet.

Vanderpoel¹_{Apr. 14, '94} reviews, with much cleverness, the treatment of diabetes, and also recommends oxygen, adding that transfusion is sometimes indicated.

Battistini¹¹⁶_{No. 10, '93} treated two cases of diabetes with a liquid, as aseptic as possible, prepared from the fresh pancreas of the calf and sheep. It was cut into small pieces and digested for twenty-four hours in an equal weight of glycerin or a physiological solution of chloride of sodium. At the end of this time it was expressed and the solution filtered through sterilized paper. It was injected pure or diluted with sterilized water (extract of glycerin). Antiseptic precautions were absolute (though an abscess occurred), the dose used being 5 cubic centimetres ($1\frac{1}{4}$ fluidrachms) in the beginning, progressively increased to 15 and 20 cubic centimetres ($3\frac{3}{4}$ and 5 fluidrachms). In both cases there was a diminution of the sugar and an increase of diuresis. With small doses the diminution was temporary, and somewhat durable with average-sized doses.

Annotti⁵⁸⁹_{Aug., Sept., '94} also treated two cases with the same liquid, and concludes that it exercises no influence upon the glycosuria and that the patients derive no benefit from the injections, which, besides, are painful. MacNamara²_{July 21, '94} suggests the ingenious idea of giving the pancreatic juice by rectal injection, in order that it may be absorbed by the portal vein and reach the liver directly. He has had no experience with the method.

Pietro Cavallo³¹⁹_{No. 32, '94} publishes the case of a diabetic woman, aged 52 years, the disease being probably consecutive to an attack of influenza which occurred two and a half years previously. She was treated for some months by the daily application of the continuous current; the stomach was also washed out several times, on account of dilatation, which co-existed with increase in the size of the liver. Exercise was prescribed, with a minimum of treatment. There were 5 litres (quarts) of urine daily, with a

specific gravity of 1032, containing 40 grammes ($1\frac{1}{4}$ ounces) of sugar and 0.95 gramme (14 grains) of albumin. After two and a half months of treatment the quantity of urine was normal, the specific gravity was 1012, and the sugar and albumin had disappeared, although the diet was not severe. It may be noted that previous to this mixed treatment the patient had been submitted, without success, to Cantani's method. As to the details of the application of the current, they are given in the article, but appear to us to be without importance.

Michaelis ¹¹⁶_{No.5,'94} reports the case of an elderly man affected with mild diabetes for thirteen years, who, on account of rheumatic pain, took 8 to 10 grammes (2 to $2\frac{1}{2}$ drachms) of sodium salicylate daily for two months, which at the time caused a certain toxic effect. During the entire period no sugar was found in the urine. One day, after cessation of the drug, traces of sugar appeared, and nine days later there were 48 grammes ($1\frac{1}{2}$ ounces) per litre (quart). The figure then returned to what it had been before the administration of the salicylate.

Hildebrandt ⁴_{Feb.5,'94} suggests that piperazin be employed in cases of diabetes. He abandoned syzygium jambolanum on account of its instability, and after he had failed to lessen artificial diabetes by a sero-therapeutic method he endeavored to find a drug which would exert an inhibitory effect on the fermentative changes which produce sugar within the organism without lessening the alkalinity of the body-fluids. He found piperazin to be possessed of these properties. It is strongly alkaline in reaction, and is eliminated in the urine without being decomposed. When artificial fermentations were carried on by adding a little dogs' serum to a solution of starch, the presence of 1 part of piperazin in 1000 was found sufficient to diminish the production of sugar to a very marked extent. By a series of experiments he proved that piperazin does not destroy the amylolytic ferment, but merely diminishes its activity. In this respect the author finds that it surpasses all the drugs, such as salicylic acid, lactic acid, arsenic, syzygium jambolanum, extractum myrtilli, which have been employed in human diabetes. In the glycosuria induced by the administration of phloridzin to dogs, and which depends upon an increased production of sugar, he obtained exceedingly-good results by the administration of piperazin. In one case, after the ingestion of about

30 to 45 grains (2 to 2.93 grammes) of piperazin, the quantity of sugar in the urine was diminished about 90 per cent. on the second day. In another case it sank from 20 to 1.2 grammes (5 drachms to 18 grains); another from 21 to 1.75 grammes ($5\frac{1}{2}$ drachms to 27 grains); in another, from 9.16 grammes to 0.1 gramme ($2\frac{1}{4}$ drachms to $1\frac{3}{4}$ grains). After considering the probable mode of action of the drug in lessening glycosuria, Hildebrandt suggests its use in human diabetes, the dose being given half an hour before meals, after the gastric juice has been neutralized by a dose of bicarbonate of soda.

Palma ⁴_{Nov. 13, '93} has used benzosol, recommended by Piatkowski, in six cases of diabetes. Tables are given showing in each case the amount and specific gravity of the urine, the percentage and total daily amounts of sugar, and the weight of the patients during the treatment. In two of the cases it was shown that benzosol leaves the body in the same way as salol, the ethyl-sulphuric acid in the urine being increased. The author could not find that benzosol was of any use in these cases. On the other hand, it must be given with caution, as it frequently at first produces diarrhœa, which may be dangerous in cachectic patients. In one case guaiacol-carbonate was also tried, but without result.

Lenné ¹¹⁶_{No. 5, '94} confirms the negative results which he had previously obtained from the use of jambul in diabetes. Pilocarpine is recommended ⁸¹¹_{Apr. 1, '94} in the dose of several milligrammes daily, to calm the thirst of the disease.

T. Clemens ¹¹³_{No. 5, '94} praises the action of guaiacol in the treatment of diabetes and the associated polyuria. The dose of the (pure) drug was 3 to 6 to 10 drops, three times a day, in a tablespoonful of milk, or, if tolerated, in an eggcupful of codliver-oil. In order to control its influence he did not order any special diet and examined the urine, passed after dinner, on several consecutive days. After the patient had taken the drug for eight days his urine, which usually contained from 1.86 to 2.90 per cent. of sugar in the afternoon, showed a very considerable reduction; in some cases the sugar was only present in a very slight quantity, in a few entirely lacking. After it had been taken for two to four weeks, here and there, a few sweet foods containing sugar could be allowed without influencing the amount of sugar in the urine. A still more striking action was observed in the polyuria of diabetics. In

some cases the quantity of urine was reduced by one-half in eight days. This was controlled by discontinuing and reducing the dose of the drug. In all cases the general condition was improved, while the remedy was well borne.

FEVERS.

By F. SEMELEDER, M.D.,

MEXICO.

GENERAL CONSIDERATIONS.

ACCORDING to C. C. Easterbrook,³⁶_{May, '94} it should be borne in mind that hyperthermia, or pyrexia, does not always mean fever, though commonly accompanying it, and that hypothermia does not imply an absence of fever. The distinction between fever and pyrexia rests upon the distinction between heat and temperature. There may be pyrexia without fever and fever without pyrexia. The body-heat is a form of energy produced in and lost from the body and estimable by the calorimeter. The body-temperature merely expresses the relation between production of heat and loss of heat and is estimated by the thermometer. F. H. Lewis,²_{July 14, '94} relates the case of a boy of 10 months, who had multiple subcutaneous abscesses, whose temperature before death rose to 42.5° C. (108.5° F.). All the organs except the brain were found studded with recent tubercles. A gland above the right bronchus, enlarged to the size of a walnut, contained cheesy material and, in the middle, a thick, puriform fluid, which was the centre of infection.

Richet³_{May 23, '94} relates a case of hyperthermia in a woman who, during an attack of intermittent fever, had a temperature of 45° C. (113° F.), and during another attack 46° C. (115° F.). Quinine sulphate brought about recovery.

J. Teissier³_{Apr. 28, '94} had in his wards a woman with characteristic pneumonia, without rise of central temperature. During the first four days after admission her temperature declined to 36.4° C. (97.5° F.), and only when the local symptoms improved did the temperature rise to and above 37° C. (98.6° F.). A second patient had a severe attack of intermittent fever fifteen years ago. These attacks returned occasionally, and after four years changed in character, beginning with noticeable hypothermia,—36.5° or 36.3° C. (97.6° or 97.4° F.). The normal temperature of the

central parts did not return until the access was completely over. Another patient, a young female, had rheumatic pains, followed by intermittent fever of certain type, with morning accesses and tumefaction of the spleen. At the beginning of the attack the temperature fell below 37° C. (98.6° F.) and did not rise again until the access was over.

Young people, mostly children of gouty or rheumatic parents, from quite insignificant causes sometimes show symptoms of fever, the thermometer, however, marking but 36° or 36.5° C. (96.8° or 97.6° F.). These phenomena, though generally of very short duration, may last three or four days, and are subdued by a dose of quinine. The same condition is occasionally observed in grown people, and may be due to intense cutaneous evaporation or to retention, in the blood, of certain toxic substances caused by insufficiency of the kidneys. Hypothermia is likewise observed in auto-intoxication of intestinal origin and in insane patients.

Geo. F. Still ⁶_{May 10, '94} recalls the fact that the temperature in children is liable to undergo extensive fluctuations, which are a fruitful source of error in diagnosis. These obscure pyrexial attacks are in some way related to the nervous instability of childhood. Organic lesions of the brain-cortex have a marked effect upon the body-temperature, whence it has been presumed that the cortex exercises some function upon the thermolytic and the thermogenic centres in the medulla and corpus striatum. Functional disturbances of cortical processes, without organic lesions, are likewise admitted,—as epilepsy, infantile convulsions, hysteria, etc. If the motor, sensory, and psychical functions of the cortex are disturbed without any demonstrable organic lesions, the thermotaxic function may be liable to similar functional disturbances.

Two unusual cases of pyrexia are described by Short. ⁵_{Sept., '94} The first was that of a female, with great anæmia, who, for twenty-four hours, had a temperature of 99.5° F. (37.5° C.); then it rose to 102° F. (38.9° C.), falling, the next morning, to normal. The day after this it rose again, during the twenty-four hours, until it reached 102.4° F. (39.1° C.), with rigor. Quinine reduced the temperature again to normal, and sweating took place. The temperature was irregular for the next two weeks, rising to 102° F. (38.9° C.) within every twelve hours, and twice it rose to 104° and 106° F. (40° and 41.1° C.), usually, however, subsiding to

99° F. (37.2° C.) after the exhibition of quinine. There was no reason to believe that enteric fever existed. Recovery took place under iron and quinine. The second case, a man of 29 years, came under observation about the fourteenth day of an attack of enteric fever. Seven days later he had a rigor, with temperature of 104° F. (40° C.), followed by profuse sweating and decline of temperature to 95.4° F. (35.2° C.). On the following day the same conditions were repeated, and, the day afterward, rigor and decline of temperature to 95.6° F. (35.4° C.). Recovery occurred. In both of these cases examination of the blood for malarial plasmodiæ would have greatly strengthened the diagnosis.

Onimus²⁶_{Mar. 1, '94} calls attention to the differences of external temperatures as indicated by the thermometer and by the bodily sensation experienced in winter at sunset; the thermometer may show the same number of degrees and yet we feel colder than in the morning. According to Onimus, our sensations are correct and the thermometer is wrong, even if there be no defect in the instrument. The wet-bulb thermometer furnishes data more in accordance with bodily sensations. The difference between a dry- and a wet-bulb thermometer is usually 2.4° C. (4.3° F.) and may even reach 10° C. (18° F.), according to the dryness and stillness of the air.

Hehir²³⁹_{June 16, '94} states that it is a curious fact that the human body in fever occupies a larger volume than during normal temperature. A man weighing 60 kilogrammes (132 pounds), and whose temperature is raised from 98.6° to 104° F. (37° to 40° C.), is enlarged about sixty-two cubic centimetres. The connective tissue (tendon) is extended, while the elastic tissue and skin are contracted.

Pirini and Lornaca⁹⁹⁶_{May 10, '94} have studied the relation of increase of temperature to the number of red blood-corpuscles and leucocytes, finding the former greatly diminished, this reduction being the more rapid the more intense the fever. In malarial paroxysms, which are short, this reduction may go on to almost complete disappearance. The diminution is in direct proportion to the elevation of temperature and in inverse proportion to the number of leucocytes. After feverish diseases the red blood-corpuscles tend to increase beyond the average, the maximum number appearing from six to ten hours after the feverish access.

G. M. da Silva Jones, of Lisbon, ²⁶⁸_{Apr. 15, '94} presented to the Eleventh International Medical Congress an essay upon his theory of fever. Peroxide of hydrogen, formed by means of oxyhæmoglobin, is the ordinary agent of combustion throughout the organism. The evolution of the bones bears such a relation to hæmatosis that any disturbances that cause an increase of carbonic acid in the blood is invariably followed by resorption into the blood and partial decomposition of a portion of salts from the bones. Peroxide of hydrogen being the agent of ordinary calorification, no hyperthermogenesis can take place without the presence in the organism of a higher proportion of peroxide of hydrogen; and no excess of peroxide of hydrogen can be present without the conditions of its production being increased. If the phosphates of the bones are dissolved by carbonic acid and retained in the fluids of the organism in a larger proportion than usual, together with sufficient carbonic acid, greater decomposition of the former will occur, followed by further decomposition, the consequence being that a larger proportion of peroxide of hydrogen will be formed and spent, with an increased production of heat,—that is to say, with the production of fever. An increase of carbonic acid in the fluids of the organism is, therefore, a primary essential in fever. The increase of phosphates and diminution of chlorides in the urine during fever bear out these views, as does the similarity between the anatomical disturbances in the tissues, as compared with those due to poisoning with acids, phosphorus, etc. Among the lesions to be found in every case of fever the author claims that those of the skeleton will prove the most constant, being undistinguishable from those observed in osteitis.

Alex. Rabe, of Berlin, ¹³_{Apr., '94} believes that the discovery of pathogenic microbes and their products has singularly restricted the conception of fever and shaken the doctrine of unity of the neuropathologists. The experiments of Centanni and Bruschetti ⁵⁸⁹_{Nov. 7, '93} seem to show that the fever-poison of the different species of bacteria, as well as the substance that neutralizes the complex of morbid symptoms, is unique and common to all.

Maragliano, of Genoa, ⁵⁸⁹_{Aug. 14, '94} says that there is a constant relation between fever and the presence of phenomena of general infection, depending on the passage into the circulation of bacterial toxins, the elevation of temperature being evidently connected

with a special period of biological activity in the pathological micro-organisms of the morbid foci.

In discussing the rôle of nervous debility in the production of fever, Bouchard, of Paris, ⁶⁷³_{May, '94} states that fever patients brought into hospital nearly always show an elevation of temperature on the day of the entrance or the following day, this elevation—sometimes as much as one degree—being due entirely to the influence of the nervous system. The visits of friends, as is well known, cause a return of the fever; muscular fatigue increases it or causes its return in a convalescent who gets up for the first time; and, in a tuberculous patient, even a very short walk will cause an increase of two degrees in temperature. These factors do not produce fever in a healthy man, and fever in disease is not generally attributed to them. Daily observation, however, warrants the author in asserting that indigestion, bodily or intellectual fatigue, or moral perturbation, which plays an established empirical rôle in the development of diseases, may also aggravate such diseases or compromise recovery. Fever would here be produced by the aggravated disease, and not by the perturbing influence, which would thus act but as the indirect cause.

F. Kraus ⁵⁷_{Mar. 25, '94} ⁶⁷³_{May} reviews the various prevalent theories upon the vasomotor phenomena of fever, particularly those of Heidenhain, Senator, Bouchard, and Charrin. It is known that during the stage of chill the turgescence of the skin is diminished, the superficial arteries are contracted, and the peripheral temperature is lowered, while the central temperature is increased. The diminution in the turgescence of the skin is due to contraction of the small arteries, and at the height of the fever increases after dilatation of the cutaneous vessels; the venous blood is also redder than in the normal state. Thermo-electric examinations showed that the vasomotor reflexes of the skin were preserved and that the vessels alternately contracted and dilated. Calorimetric examination demonstrated that the elevation of temperature was coincident with a diminution in heat-radiation. Antipyretics increased this radiation to a greater degree than did cold water. He also found that the number of red cells and the blood-plasma were not modified during fever. His researches show the importance of vasomotor phenomena in fever, but do not explain the process. It seems, however, that toxic agents act upon the vaso-

motor nervous system, upon which depend the thermogenic process and heat-radiation,—a view already advanced by Billroth.

The signs of threatening heart-failure in fever are, according to Huchard,¹⁴_{July 8,'94} the weakening and disappearance of the first cardiac sound, the fœtal rhythm of the sounds (embryocardia), and the lengthening of the diastolic pause (bradydiastolia). These are not caused by myocarditis, but by disturbance in the innervation of the heart and vessels or the heart alone. In enteric fever disturbed innervation and myocarditis combine to produce the well-known cardiac complications. Hayem, however, believes that myocarditis in enteric fever is not at all uncommon.

G. M. Dewey, of Missouri,¹⁵⁹_{Feb., '94} remarks that typhoid fever in that part of the United States is not what it was forty years ago. It is milder and the death-rate is smaller. It is generally milder in its course on the Pacific slope than on the Eastern coast, according to Washington Ayer, of San Francisco.⁷⁷_{July, '94} Certain fevers in the Lake Erie region (which is not now malarial), and which Nelson G. Richmond¹_{Feb. 10, '94} feels inclined to call "Northern remittent fevers," are believed, by Jacobi, in many cases to be nothing else than cases of fœcal poisoning in which constipation had continued for weeks.

INFLUENZA.

Etiology; Bacteriology.—R. Pfeiffer, who, in 1893, found an hitherto-unknown, well-characterized, minute bacillus, succeeding in showing its etiological significance in influenza, has continued his studies on the same subject.⁵⁸_{B. 13, II. 3;} ²²_{Feb. 21, '94} Attempts at pure cultivation of the bacillus failed except in a few cases in which sputum or pus from the expectoration were fed on agar, when small, perfectly-transparent colonies of bacilli were obtained. Attempts to produce further cultivations from these colonies, however, always failed. When the sputum of purulent influenza was spread on blood-agar it was easy to procure the colonies and to continue the cultivations through successive generations, whilst inoculations on any other nutrient soil remained sterile. Further investigations showed that the constituent of the blood required by the bacillus is the hæmoglobin of the red blood-corpuscles. The bacillus is strictly anaërobic; the extreme limits of its development are 42° and 20° C. (107.6° and 68° F.). It dies quickly in drinking-water and in suitable nutrient soils lives about four-

teen days. It is assumed that in moist sputum it can live about fourteen days. A permanent form of the bacillus had not been discovered. From his investigations the author draws the following conclusions: (1) development of the influenza bacillus in soil or water outside the human body is not possible; (2) the spread of the disease by direct sputum reduced to dust can only take place to a limited extent; (3) the contagion, as a rule, is contained in the fresh and still moist secretion of the nasal and bronchial mucous membranes. The bacilli are found in enormous quantities in the nasal secretion, which ordinarily is very poor in bacteria. In the acute stages of influenza, bronchitis, or pneumonia the bacilli lie in masses, the pus-cells remaining quite free; as the process advances, these relations change, and during convalescence the great bulk of the bacilli are to be met with for weeks within the pus-cells, where they show evidence of degeneration. The author has never seen bacilli in the blood, though they may be found there; but he has repeatedly seen them in the kidneys and spleen. His first experiments on animals were only successful on monkeys; no true infection was set up in any of the animals experimented on.

Teissier ³_{Sept. 12, '94} says that Arloing was among the first to find in the blood of influenza patients, at the time of febrile invasion, an element cultivable and inoculable in animals. The influenza germ is essentially polymorphous and has varied forms. Jarron, in fifty-one out of sixty-two influenza cases, has found the specific diplobacillus. At the time of defervescence it is easily found in the urine. A. Fränkel, ²²_{July 4, '94} in five fatal cases of influenza pneumonia, found the bacilli in the rust-colored sputum. Leyden, in the discussion, said it was not quite plain how a micro-organism that was only found in the expectoration could be considered as the cause of the whole disease.

A. Bruschetti ⁵⁸⁹_{Dec. 8, 14, '93} has isolated a bacillus and cultivated it *in vacuo* in animal broth. Hypodermatic, intra-venous, or intra-tracheal injections of that culture had no pathological effect on guinea-pigs, rabbits, dogs, or white mice. Blood-cultures of the microbe gave better results. White mice and dogs were likewise refractory, but pigs and rabbits showed morbid symptoms after tracheal and sometimes intra-venous injections. High temperature, up to 41.2° C. (106.2° F.), was observed two or three days

after injection, with emaciation; and in five or six days an abundant flow from the nose and râles in the bronchi. Sudden fall of temperature and death followed, sooner or later, according to the quantity of the culture injected and the resisting power of the animal. The tracheal and bronchial mucous membrane was red and covered with a thick layer of mucus; in more serious cases pneumonic foci, which, as well as the bronchial secretion, contained the micro-organism, yielded successful new cultures. Injections under the dura mater had no effect; intra-peritoneal injections sometimes gave results, while injections into the pleura, pericardium, and knee-joint were constantly followed by positive results, with multitudinous bacilli in the abundant exudation. Pfeiffer objects⁵⁰_{Dec. 23, '93} that Bruschetti's bacillus is not the real influenza bacillus, but the latter states that in nine influenza patients out of eleven he found the micro-organism in pure cultures of blood. He claims that he was the first to observe that this micro-organism finds more favorable vital conditions in the blood than in any artificial medium. Borchardt⁴_{Jan. 8, '94} studied thirty-five influenza cases bacteriologically, and concludes that Pfeiffer's bacillus is almost always found in the sputum and in doubtful cases helps to establish a diagnosis. E. Klein²_{Feb. 17, '94} has studied the action of antiseptics and other materials on cultures of the influenza bacillus. It does not grow on acid mediums, grows well on the same medium if the reaction is alkaline, and less vigorously if neutral. The bacillus, subjected to the action of carbolic acid in a 0.5-per-cent. solution for ten and fifteen minutes and afterward transferred to nutritive medium, shows good and normal growth; it is killed by a 1-per-cent. solution for ten minutes; five minutes' exposure to a 1-per-cent. solution does not devitalize it; izal, in a 0.5-per-cent. solution for five minutes, kills it.

Pielicke⁴_{June 4, '94} states that so far the principal characteristic of the influenza bacillus is found to be a negative one in that it only grows on blood-agar or on other substances containing blood, but never on simple glycerin-agar. P. Tsikliusky⁸⁶⁰_{Mar. 30, '94} states that Huber has found a new nutritive medium for the influenza bacillus, viz., gelose with hæmoglobin. He uses a liquid, aromatic, and very dark red preparation, sterilized at 100° C. (212° F.), adding previously potash (until a very alkaline reaction is obtained) to prevent coagulation, which would render it opaque;

he then eliminates the precipitated alkaloids by filtration and thus obtains a sterile and transparent liquid, to which he adds liquid gelose, cooled down to 50° C. (122° F.), to form a solid, dark-red medium. The influenza bacillus grows well on it, though very slowly (three to five days), and remains a longer time alive (thirty-eight to forty days).

Symptomatology and Diagnosis.—Hervouet ¹²⁷_{Dec.12,'93} relates three cases in which the diagnosis of influenza was doubtful. A lady spent the summer in the country, fell sick with fever which lasted ten days, the symptoms being red face, excitement, pains, no noticeable digestive troubles, no epistaxis, nor red spots. Typhoid fever was excluded, as the mind was free and the patient showed intellectual activity, contrary to what is observed in typhoid. Under quinine improvement took place. Hervouet does not admit a malarial causation, and regards this case as simply of non-catarrhal influenza. The second case, a child 12 years old, who suffered repeatedly from angina, had an attack accompanied with continuous fever, the temperature being much like that in typhoid. Occasional broncho-pneumonic râles were heard and acute consumption was suspected, but a quick recovery took place. The third case, a man of 38 years, had continuous fever of typhoid type, typhoid being excluded on account of the mental condition and lack of certain symptoms.

W. E. Burton ²²_{Jan.31,'94} distinguishes three forms of influenza: 1. Typical, uncomplicated with a fall of temperature for twenty-four to thirty-six hours, sometimes for three days, frequently too short to be noticed; rise of temperature usually extremely rapid; almost concurrent with this, headache, more or less severe, affecting either the whole head or more commonly the occiput or sinciput; dorsal pain, often severe; pains in the limbs, sometimes like flashes of fiery heat; frequent delirium, insomnia, great nerve-prostration, and, probably as result of this, muscular debility; nausea, sometimes sickness; injection of conjunctiva, without overflow of tears; painless inflammation or hyperæmia of mucous membrane of tonsils or pharynx. He believes that the other "forms" of influenza are those in which either an affection is developed in a patient already the subject of influenza or in which the disease attacks a person previously weakened by some catarrhal affection. These catarrhal symptoms are the result of

exposure to cold and may precede, accompany, or follow influenzal invasion. 2. Influenza intercurrent with disorders of the respiratory tract, as coryza, bronchial catarrh, pneumonia, "idiopathic" or "catarrhal" pleurisy, etc. It is not uncommon for a patient suffering from catarrhal bronchitis, etc., to be treated for influenza, recover, and within a few days to be attacked with typical influenza. 3. Abdominal influenza. In this variety there is, from the beginning, severe gastro-intestinal disturbance, as thickly-coated, creamy, moist tongue; sickness or nausea; anorexia; diarrhoea, sometimes choleraic; and constipation. There is very little fever or even subnormal temperature, but severe cephalalgia, etc.

Charles B. Williams ¹⁹_{Jan. 13, '94} states that the local symptoms, as a rule, begin in the nose and conjunctiva and extend downward, the mouth, tongue, and fauces being sore. A prominent symptom of last year's epidemic was severe supra-orbital neuralgia, sometimes with shooting pains in the frontal sinuses, due either to packed-up nasal secretions or purely neuralgic. This neuralgia sometimes persisted after the active symptoms of grippe had subsided. J. Vinderogel ²⁷⁰_{Feb., '94} observed, in his case, principally nervous depression, excitement of ganglionic and vasomotor systems, fever and congestion of the respiratory and digestive apparatus.

Sir Peter Eade, ⁶_{Sept. 30, '93} speaking of four consecutive epidemics of influenza at Norfolk, England, says that during the first year the primary fever was more severe, the acute inflammatory complications—pleurisy, neuritis, and severe local neurosis—more frequent, the bronchial affection rarely passing beyond a dry, sibilant rhonchus. Since then pneumonia and bronchitis were more common and pleurisy less frequent. In the third year there was very little local neuritis, but more disturbance of cerebral and spinal centres; active gastro-enteric symptoms appeared increasingly, and, during the last epidemic, implication of the nervous system, both primarily and secondarily, was still more frequent, with permanent debility. The great majority of the cases were uncomplicated; high temperature continued, in a few cases, three or four weeks, morning temperature in some cases being higher than that of the evening; loss of taste or smell was frequently noted, and in one case marked and prolonged desqua-

mation of the mucous membrane of the soft palate; in some cases great limb-weakness or partial paraplegia followed, with tenderness over cervical and upper dorsal vertebræ and fixed pain in the sternal region. In the last two years much less alcoholic stimulants were required or borne. Eade believes influenza to be dying out. J. M. Da Costa¹¹²_{Feb., '94} saw cases of influenza simulating typhoid fever and cerebro-spinal meningitis. Carl Seiler¹⁹_{Mar. 31, '94} thinks it necessary to establish a special form of influenza, which he calls "American Grippe," or Myxoid Œdema. We cannot see any difference between the "American Grippe" and the common form.

Logothetis⁸⁷_{Jan. 31, '94} remarks that the symptoms of influenza in animals are very similar to those in man. He is of the opinion that an epidemic of influenza may modify other epidemics; for instance, scarlet fever disappeared and re-appeared only when influenza was extinct in Bremen, 1833; small-pox diminished considerably when influenza made its appearance in Bremen; malaria subsided in Italy and Denmark while influenza reigned.

Wørner³¹⁹_{June 2, '94} describes a local epidemic of typhoid influenza among a body of German troops at Hohenzollern. The fever was high and lasted thirteen and one-half days on the average, with great prostration and diarrhœa. Out of the thirteen patients one died.

Juan Brena, of Zacatecas, Mexico,¹⁷⁹_{July 15, '94} in three cases of influenza found a difference of temperature under the two armpits. In the first case, a man of 49 years, the temperature from the beginning was 37.9° C. (100.2° F.) in the right armpit and 38.5° C. (101.4° F.) in the left axilla and in the mouth. In the second case there was for eight days a difference of 0.6° C. (1.08° F.) between the two axillæ. In the third case, a decidedly neurotic individual, during the last of three attacks of influenza it was observed that the side on which he lay remained cool to the touch and without perspiration, while the other side became hot and sweated. He quotes several similar cases, but not as a phenomenon of influenzal poisoning.

Destrée⁸⁶⁸_{Mar. 10, '94} says that, however slight an attack of influenza may be, it often takes six weeks until complete recovery takes place. "A convalescent from influenza is a real neurasthenic."

Complications and Sequelæ.—Eichhorst²¹⁴_{Mar. 4, '94} had a case of

suppurating parotitis, another of gangrene of the right arm, and three cases of pulmonary gangrene after influenza and pneumonia. C. W. McNeil¹⁶¹_{Jan., '94} observed a case of uterine hæmorrhage, J. J. Buchanan one of hæmorrhage from the bladder, and E. H. Small a case of miscarriage after influenza. D. Thomas, on the contrary, believes that influenza had no effect whatever upon pregnancy. T. Kebler, of Cincinnati,⁴²⁶_{Jan., '94} has observed nasal hæmorrhage so severe only to be controlled by plugging the anterior and posterior nares. Pugin Thornton, of Canterbury, England,⁶_{May 12, '94} observed acute laryngeal œdema after influenza.

W. A. Wills⁶_{May 12, '94} remarks that the number of lobar pneumonias in 1891 was considerably larger in comparison to other years, though the cases of pneumonia directly following influenza were few. Wm. Craig⁶_{May 12, '94} is inclined to consider the frequent complication of influenza as a peculiar further development instead of an accidental intercurrent complication.

A. Eshner⁹_{Feb. 10, '94} saw a case of pleuritis and endocarditis following influenza. Matthew Caw²_{May 19, '94} communicates six cases in which heart-failure was observed in connection with influenza, and states that fatal syncope may arise from impairment of the heart itself, its muscle, ganglia, and vagal centres, or from the unusual fall in the blood-pressure, so that the heart beats against insufficient resistance, exhausts itself, and tends to stop in diastole. Digitalis and its derivatives must be used with caution. Alex. Morrison⁶_{Jan. 6, '94} finds that, of 53,085 deaths due to diseases of the circulatory system during 1891, 1355 were ascribed to syncope, and thinks that many of these cases were due to preceding influenza. He quotes one case of Reynolds, one of his own, and another in which three weeks after convalescence from influenza the whole internal saphenous vein became plugged. There seems in these cases to be some tendency to the formation of intra-vascular coagula.

Olin F. Buell¹⁸⁶_{July, '94} relates a case of inflammation and gangrene of scrotum following influenza, in a man of 60 years, who was making a good recovery, when he went out and caught cold. He had then severe chills, temperature 39.7° C. (103.4° F.), with retention of urine. The catheter was passed without trouble. The scrotum became œdematous, reaching the size of the patient's head. A week afterward gangrene appeared in three places, discharging

foul-smelling pus and involving the urethra. Demarkation then began, the fever subsided, and the man recovered. The same physician saw two more cases of senile gangrene following the grippe, both fatal. Laurents ³⁶⁶_{June 2, '94} observed a case of symmetrical gangrene of spinal origin (of the gray substance) after influenza in a boy 7 years of age. The tips of the fingers and toes were first affected, the patient dying on the tenth day under coma, the gangrene having reached the forearms.

Veil ¹⁵²_{July 20, '94} observed a fatal gangrenous phlegmon of the back following influenza. The patient was 50 years old and had pulmonary emphysema. On the 20th of February he was taken ill with influenza, having great prostration, pains about the heart, and dyspnoea. On the 4th of March the pulse was 39, there were frequent fits of coughing, and thick sputum was expectorated, showing that the pulmonary congestion was extending. About the 5th a fetid stench was observed in the expectoration, and from the 22d high fever (39° C.—102.2° F.) persisted, the heart began to fail, the pulse became intermittent, there were profuse sweats, cutaneous emphysema on the lower left side of the neck, swelling of the lumbar region, and tympanitic percussion-sound. Incision gave exit to two litres (quarts) of ichorous, foul pus. Death soon followed. The question was raised as to whether the case was one of grippal infection or whether the pulmonary gangrene had extended by involvement of the pleura.

N. Marcopoulos, of Cephalonia, ³¹_{Aug. 29, '94} had a patient who, after having gone through an attack of grippe, was affected with phlebitis and thrombosis of the right femoral veins. On palpation a characteristic venous cord could be felt under the fingers. The whole limb was red, swollen, œdematous, and tender. The temperature was 38.9° C. (102° F.), pulse accelerated. The condition had almost disappeared when the left leg became affected by the same process. The patient finally made a good recovery.

W. Percy Reynolds ⁶_{Dec. 30, '94} reports a case of mild influenza in a woman of 31 years who had suffered from an attack of hysterical mental instability fifteen years previously, and who was accustomed to tight lacing. On the sixth day she felt an acute pain between the shoulders, and syncope and death followed. At the post-mortem examination all the internal organs were found in a healthy condition, the aortic and pulmonary valves being healthy;

an ante-mortem clot was seen in the right auricular appendix extending into the right ventricle, with an aortic thrombus in the valvular orifice. The heart-muscle was apparently healthy. P. Meyjes ⁴¹_{Aug. 6, '94} describes a case of hysterical neurosis following influenza in a boy of 13 years. During convalescence spasmodic sneezing (up to forty consecutive times) occurred, ceasing during sleep, but provoked by touching the left wing of the nose. The mucous membrane on that side was a little inflamed. Application of chloral hydrate was successfully used. N. Musmeci ⁵⁹⁶_{Aug., '94} saw a case of post-influenzal hysterico-epilepsy in a girl of 23 years.

W. Gardner ²⁸⁵_{Jan. 15, '94} describes two cases of Graves's disease, and Diamantberger ¹_{Apr. 7, '94} an intra-muscular abscess following an influenza. Hervouet ¹²⁷_{Feb. 12, '94} has seen characteristic cases of uræmia after influenza.

A case of ascending myelitis and death is reported by Deroye and Gallois. ²¹²_{Mar. 10, '94} Porte ³¹_{July 23, '94} publishes a case of meningitis in a young man of 20 years, the influenzal manifestation being proved by bacteriological examination. The blood contained encapsulated diplococci with rapid motion.

W. Watson ¹_{Mar. 31, '94} states that brachial is the most common form of influenzal neuritis, comprising nearly half the cases; then follow intercostal, sciatic, lumbar, epigastric, cervical, and lower abdominal. These neuroses are in general very refractory to treatment. In three cases localized pain in the epigastric and abdominal region yielded at once and permanently to one application of the battery.

H. N. Mayer ⁹_{Feb. 24, '94} records a case of intercostal neuralgia, neurasthenia, and irritable prostate following influenza, and Leyden ⁶⁸_{July, '94} one of neuritis in a woman of 46 years. Paralysis of the right facial nerve occurred; then œdema of arms, legs, and back; pain in the right side of the neck, headache, and sensation of pressure over the right clavicle and upper part of the arm. Recovery took place. In another case there was ascending paralysis, fever at times, motor weakness, vomiting, paralysis of the extremities, loss of voice, sweating, paræsthesia, nystagmus, abnormal electrical reaction. Death. The nerves showed symptoms of neuritis, turgescence of cylinder-axis and nervous fibres, mostly in the lower thoracic region. The lateral columns of the spinal cord were principally affected, the anterior columns less, and the pos-

terior were free. In the gray substance the ganglionic cells were enlarged, with a few vacuoles. L. Stembo²¹_{May 26, '94} observed a case of progressive bulbar paralysis in a previously healthy woman of 29 years, after influenza.

H. D. Lawhead¹⁴⁷_{Apr., '94} has seen influenza followed by such predominating nervous symptoms that meningitis, etc., might have been suspected; in several cases there was marked despondency and even suicidal mania. Peary and Caldwell made similar observations. All three object to the indiscriminate use of coal-tar preparations.

André Martin¹¹_{Oct. 8, '93} had a case of abortive grippe, with coma, and a case of maniacal agitation, followed by death, in a young soldier.

Stephen Left, of Canada,⁷⁶⁰_{June 30, '94} states that the most serious disorders may follow a second or third attack of influenza, although these successive attacks may each be milder than the preceding one. Among other nervous troubles he observed paresis of the facial and ocular muscles and of the organs of speech. Melancholia comprises fully one-half of post-influenzal insanities and frequently develops suicidal tendencies. Mania is the least frequent sequela, but paranoia and post-febrile hysteria are observed. Recovery is slow in these cases.

W. H. Aldrich and others⁹⁹_{Oct. 5, '93} mention as sequelæ of influenza a pulmonary congestion, which they do not consider to be real pneumonia; disorders of the liver, kidneys, and pelvic organs; perverted action of the heart and peculiar forms of pulse; rheumatoid manifestations, neuralgia, hyperæsthesia and paræsthesia, neuritis, meningitis, cerebritis, and combinations of these affections, deep and lasting prostration, and insanity. Dinsmore thinks that some of these cases of weak heart may be due to too much medication, too large doses of phenacetin, acetanilid, and antipyrin. Conn and Russell each saw one case of delirium lasting for months. In Conn's case the delirium recurred the following year. Palmer regrets having ever given acetanilid, antipyrin, etc. R. Massalongo and Silvestri⁷⁶²_{Aug., '94} publish a case of post-influenzal infantile sclerosis à *placques disséminées* in a girl of 6 years. B. Bixbaum³¹⁹_{June 23, '94} denies the existence of a special form of cerebral influenza, for cerebral symptoms in this disease are quite common and well known.

Laurence Turnbull ¹⁹_{July 28, '94} has had an opportunity of seeing a large number of ear diseases complicating influenza, as pain, chill, fever, acute otitis media, hæmorrhagic inflammation of membrana tympani, suppuration, and perforation, the result of micro-organisms migrating from the naso-pharynx. The affection lasted from three to six weeks and required antiseptic cleansing and careful inflation of the middle ear. The nose, throat, and the Eustachian tubes required syringing with vaselin. Turnbull holds that influenzal otitis is a peculiar form. Fatal results may follow from meningitis, abscess of brain, and sinus-phlebitis. In a class of cases there is intense otalgia without either perforation or discharge. Three or four weeks afterward the patients present themselves with sunken membrana tympani and profound deafness. The use of the catheter and chloroform-vapor, or Politzer's air-bag with chloroform and ether or ether and tincture of iodine, gives prompt relief. L. Guranowsky ⁸⁴⁴_{Apr. 8, '94} advises against insufflation of air; when there is abundant secretion of pus and large perforation he prefers antiseptic washings. If fever, pain, and copious secretion continue he recommends to open the mastoid process about the fourth or fifth week.

Chambrelent ¹⁶²_{Sept. 25, '93} ²_{Dec. 9, '93} was called to see a lady, in the eighth month of pregnancy, who had suffered for a few days from fever, headache, colicky pain, and violent diarrhœa,—evidently an attack of influenza then prevalent. Labor occurred one week later. No movement of the child had been felt from the day that the colic set in. A dead, macerated child was delivered. The patient recovered speedily. There were no hæmorrhages in the placenta.

Omer ²⁹²_{June 30, '94} saw several cases of dysmenorrhœa in women who had never before complained of such troubles. Miscarriage and premature labor were frequent complications. In a Turkish primipara the fœtus, which died during an attack of influenza, was putrefied, the presenting abdomen allowing the intestines to prolapse. Version and extraction were performed and the woman recovered.

Thibaudet ⁵⁵_{Sept. 1, '94} has seen two, three, and even four successive relapses in the same organism within twenty days to four months. He explains them by self-reinfection. L. M. Sweetman ³⁸_{June, '94} observed many cases of sudden death during convalescence. Edw. Anderson ⁶¹_{May 19, '94} thinks that nine-tenths are due to indigestion,

directly or indirectly, and that the timely use of carbonate of soda would avert most of them.

Treatment.—W. E. Barton ²²_{Jan. 31, '94} insists that the patient be isolated in a darkened, airy room at a temperature of 18° to 20° C. (64° to 68° F.), with not too much covering. He must keep the horizontal position, and, when raised to a sitting posture, all exertion must be avoided and the feet carefully kept warm. From the first cold milk, plain or in equal parts of barley- or soda- water, and plain boiled water now and then are given, with no alcoholic stimulant during the pyrexial stage. All kinds of excitement should be carefully avoided. As soon as the patient is in bed he gives to an adult: \mathcal{R} Digitalis-juice, 10 minims (0.65 gramme); tincture of aconite, $2\frac{1}{2}$ minims (0.16 gramme); liq. ammonium citrate, $2\frac{1}{2}$ fluidrachms (10 grammes); water, 8 fluidounces (250 grammes). One tablespoonful every hour until four doses have been taken; then every two, three, or four hours as directed, discontinuing when the temperature falls to 99° F. (37.2° C.) and remains there, and watching the heart. In cases with catarrhal symptoms the same treatment is followed, with a menthol spray every two hours or oftener, which gives immediate relief and helps to prevent the spread of the poison to the inner ear. If the tympanic membrane become inflamed a leech to the tragus will be of service. Influenza complicated with pneumonia, pleurisy, and lung-congestion (especially in cases of weak heart) is treated by the same plan when there is high temperature with a rapid pulse. When there is heart trouble aconite is better omitted or withdrawn early and larger doses of digitalis substituted. Diaphoresis will not reduce pyrexia. When there is a rapid and jerky pulse alcohol may be given freely, but no hot applications, no ice-bags, etc. Oxygen inhalation is indicated where the lungs are much involved. Purgatives should be used with great caution. In intercurrent pleurisy digitalis and aconite may be given as above if the case be seen in the first stage. Sinapisms relieve the pain. In cases of abdominal influenza in which gastro-intestinal irritation appears concurrently with typical influenza, and in which there is high temperature, he gives in addition 7 grains (0.45 gramme) of salol crystals on the tongue every five hours. Abdominal influenza without fever, but with most or all of the other symptoms of typical influenza and frequent diarrhœa, he treats on general

principles, giving salol, 5 to 7 grains (0.31 to 0.45 gramme), every four hours, but no aconite nor digitalis. Acute rheumatism complicating influenza yields rapidly to salol and phenacetin combined, each 5 grains (0.31 gramme), every four hours. No aconite is used if phenacetin be given.

J. M. Hall ¹⁹²_{Nov., '93} says that at Fayetteville, Ohio, during the epidemic of 1892, there were many cases with very high temperature (104° to 108° F.—40° to 42.2° C.), very great pain and swelling of the limbs, and the joints and vicinity were covered with purplish spots varying in size from a quarter-dollar to a dollar. All these spotted cases got up with stiff joints, which several months later still cracked and snapped with an audible noise. He considered them rheumatoid, and found iodide of potassium 4 grains (0.25 gramme), water 4 ounces (125 grammes), a teaspoonful after meals, and 15 grains (1 gramme) of phosphate of soda in water before meals, most useful. Were these pains rheumatic?

Von Mosengeil ²¹¹_{Feb. 11, '94} gives salipyrin as soon as the first symptoms appear,—0.1 to 0.2 gramme ($1\frac{3}{4}$ to 3 grains) to small children, 0.4 gramme (6 grains) to grown weak persons, and even 0.75 gramme (12 grains) to robust patients. He observed no toxic effect, but hypnosis in all cases, with relief of headache for several days. Larger doses were given when bronchial and pneumonic symptoms were present. The medicine was taken two hours before or after meals. When there was high fever salipyrin was alternated with quinine, or the first was given during the night and the latter during the day.

Samuel Wilks ⁶_{Feb. 3, '94} and A. T. Schofield ⁶_{Feb. 10, '94} indorse the use of opium in influenza. The latter treated hundreds of cases in 1892 with 10 drops of tinct. chlorof. c. morph. every four hours, and, when the pains were gone, strychnine with hydrochloric acid and a little iron afterward as a tonic. Ch. B. Williams ¹⁹_{Jan. 13, '94} gives, at the beginning, pulv. ipecac. and opium, 10 grains (0.65 gramme), either alone or with pilocarpine hydrochl., $\frac{1}{8}$ to $\frac{1}{6}$ grain (0.008 to 0.01 gramme), at bed-time in hot lemonade. When there is marked debility, quin. sulph., 18 grains (1.17 grammes); strych. sulph., $\frac{1}{2}$ grain (0.03 gramme), in twelve pills or capsules, three a day. For the neuralgic pain, ammon. salicyl., 15 grains (1 gramme) and a drop or two of a 1-per-cent. cocaine solution in the affected

nostril, or Dobell's solution with the atomizer. For bronchitis, potassium citrate, $\frac{1}{2}$ ounce (15 grammes); lemon-juice, $1\frac{1}{2}$ fluid-ounces (46 grammes); syrup. ipecac., 3 drachms (12 grammes); glycerin, $\frac{1}{2}$ fluidounce (15 grammes); water, to make 3 fluidounces (90 grammes), by teaspoonfuls. In pulmonary congestion, antimon. et potass. tartrate, $\frac{1}{2}$ grain (0.03 gramme), added to the above formula. Eucalyptol or terebene, 5 drops in capsules; alcohol in eggnog or milk-punch where there is much debility. Ramon Guiteras, ⁵⁹_{Jan. 20, '94} in all stages of influenza, regards whisky as the remedy *par excellence*, or champagne, brandy, or sherry. Quinine is also a standard remedy.

Nothnagel, of Vienna, ²⁰⁹_{Dec., '93} states that antipyrin and anti-febrin must not be used; on the contrary, stimulants are required. R. Hingston Fox ⁷²³_{Mar., '94} is not in favor of alcoholic stimulants, and MacDowel, Cosgrave, C. R. Drysdale, J. J. Ridge, John Moir, and Norman Kerr are of the same opinion.

G. C. Smith ⁸²⁶_{Jan., '94} gives a prescription which, he says, if used at the beginning will, in the great majority of cases, cure within twenty-four to forty-eight hours, without the patient leaving his business. It consists of phenocoll, 1 drachm (4 grammes); fluid extract gelsemium and tincture strophanthus, each 16 drops; saccharin, 2 grains (0.13 gramme); distilled water, 8 fluidounces (250 grammes). Half a tablespoonful in half a glass of water every two or six hours, to ease pain and cool fever.

W. H. Thayer ⁵⁹_{Feb. 3, '94} recommends bichloride of mercury, on the ground of its being a powerful germicide, $\frac{1}{32}$ grain (0.002 gramme) every half-hour at the outset, for several hours, and continued at longer intervals. Wm. Robertson ⁶_{Nov. 11; Dec. 30, '93} in most cases uses benzol. It is quite well tolerated in the form of an emulsion in lemonade, 4 grains (0.3 gramme) every two hours and a half. H. Logothetis ⁸⁷_{Jan. 31, '94} begins with calomel, then salipyrin, and, if the fever persist or complications threaten, cold baths.

John Crerar ⁶_{Feb. 3, '94} praises the good effects of bicarbonate of potash, 30 grains (2 grammes), in milk, every two or three hours, and, when the fever subsides, thrice a day, watching carefully any possible depression of the heart's action. It prevents sequelæ, principally mental distress and physical debility. T. Jackson ⁶_{Mar. 10, '94} is of the same opinion; he regards quinine as most dangerous.

An editorial writer ⁹_{Jan. 13, '94} states that, when pneumonic complica-

tions become threatening, inhalations of oxygen, given persistently, are very advantageous, with the old-fashioned flaxseed poultice and hyoscine hydrobromate to relieve pain and especially the headache, in doses of $\frac{1}{200}$ to $\frac{1}{50}$ grain (0.00032 to 0.0013 gramme). A. Rubino ⁹³⁴_{Feb., '94} recommends the old-fashioned linseed or mustard poultices and also warmed wadding and oxygen inhalations in adynamic forms.

A. A. Mannon ⁵¹⁹_{Apr., '94} has great faith in whisky or brandy during the acute stage; he never gives any of the coal-tar derivatives. He considers carbonate of ammonia to be the best expectorant. J. Hawkes ⁶_{Mar. 17, '94} has treated hundreds of cases of influenza with quinine, which he found sufficient. Gingeot ⁵_{Apr., '94} gives alcohol, caffeine, ether hypodermatically, local revulsives, nitroglycerin to relieve the work of the heart-muscle, and iodide of soda as a resolvent. Goliner ⁸⁰⁴_{June 15, '94} treated fifteen patients with analgen until the nervous disturbances had markedly receded. Striking improvement was observed as early as the second day. The urine showed the well-known intense reddish-yellow to red coloration. The smallest single dose for adults is 0.5 gramme ($7\frac{3}{4}$ grains); maximum, 1 gramme ($15\frac{1}{2}$ grains); the daily dose not exceeding 3 grammes (46 grains).

ENTERIC FEVER.

Geographical Distribution.—Native physicians almost unanimously hold that enteric fever never occurs in Mexico, either on the high table-lands or on the low lands along the coast. I am convinced, however, as are several professional friends, that it does occur, though rarely. I have no anatomical data to prove my assertion, as post-mortem diagnosis is impossible in hospital practice.

In East India, Bombay, Ahmedabad, etc., typhus is very rarely met with, while the natives are immune from enteric fever. This immunity is believed to be due to the fact that their ancestors had a sufficiency of this poison in their systems. ¹⁰⁰²_{Feb., '94} Enteric fever occurs in the Antilles, and its existence in Buenos Ayres is proven as far back as 1798. Of those who die from it only one-tenth are natives. ¹⁰¹⁶_{Feb., Mar., '94} According to A. Marvaud ²⁶_{June 1, '94} the native African troops of Algeria (and evidently not only the troops) enjoy a relative immunity from enteric fever. In 1878 the

typhoid mortality amongst the native *tirailleurs* was 1.5 to 1000; whereas amongst the Zouaves it was 22.2, and among the foreign legion 15.4 to 1000. The influences exercised by overcrowding, fatigue, infected soil, barracks, alimentary substances, etc., are the same in Algeria as in France, save that they are accentuated by the action of the climate.

Bacteriology and Etiology.—Upon an outbreak of enteric fever at Millstown, near Dublin, Sir Chas. A. Cameron ¹⁶_{Sept. 1, '94} was requested to examine the water from a pump used by the patients. He found a short bacillus, with rounded ends, undistinguishable in appearance from the typhoid bacillus or from the bacteria coli commune. Its length was 1.5 to 2 μ . No spores appeared. Its movements were rather sluggish, and it stained successfully with various solutions. He could not affirm that the little epidemic (six persons) was due to the presence of the organism described.

Uffelmann ²_{May 5, '94} has investigated the resistance of typhoid bacilli to drying and their transmission by air. Various materials, generally after sterilization, were impregnated with water and broth containing typhoid bacilli. Nutrient gelatin was then inoculated with small portions of the material at varying periods after impregnation of the latter, and in due course was examined for the bacilli. The experiments showed that these organisms resist drying and retain their power of development (1) in garden earth, 21 days; (2) in white filter sand, 82 days; (3) in sweepings from house and street, over 30 days; (4) on linen, 60 to 72 days; (5) on buckskin, 80 to 85 days; and (6) on wood, 32 days. In a moist atmosphere it is probable that the duration of life would be longer. His experiments further establish that typhoid bacilli are carried into the air with dust from the street, floor, and clothing, and are thus enabled to infect foodstuff, such as milk or bread. According to W. Spirig, ⁵⁰_{July 23, Sept. 10, '94} the question whether the complications and sequelæ of enteric fever are directly due to primary infection with the typhoid bacillus or secondarily to other micro-organisms has been settled during the last few years by a number of observations. Typhoid bacilli have been found in the inflamed meninges, lungs, testicles, kidneys; in periostitis, in pleuritis, in the gall-bladder, and in abscesses. Chiari, ⁵⁰_{May 1, Sept. 15, '94} in only three out of twenty-two corpses, found no typhoid bacilli in the gall-bladder. These may have come direct from the intestine, but

he has reason to believe that they were carried there with the circulating blood. They are almost the only bacteria found in the gall-bladder, which is not easily explained when we suppose direct infection from the intestine to take place. Injection of typhoid bacilli into the auricular vein of animals carries them to the bile. The possibility of re-infection of the intestine by typhoid bacilli in the gall-bladder should be considered.

Sanarelli, of Rome, ²⁶²_{Apr., '04} has studied the relation between typhoid virus and human and experimental typhoid fever, which, he says, is not a primarily intestinal affection. The toxin was thus prepared: A very virulent culture was obtained by passing the microbe through a series of guinea-pigs, and two flasks of glycerin bouillon inoculated with the peritoneal exudation of guinea-pigs killed in a few hours by this virus. The flasks were kept at 37° C. (98.6° F.) for about one month, and then sterilized and left at ordinary temperature for eight months, at the end of which time they were hermetically closed and left to macerate for some days at 60° C. (140° F.). The liquid formed two layers, of which the upper was perfectly clear. This was decanted from the lower with great care, and its toxic power tested on animals (rabbits, mice, guinea-pigs, and a monkey), together with others to serve as controls. The animals died at the same time, but the control animals exhibited no abdominal symptoms. Post-mortem, while in the control animals abundant peritoneal exudation was found with typical intestinal lesions, in the others there was no fluid and the intestines were perfectly normal; but, at the same time, the other mucous membranes were congested, which shows, according to the author, that the immunity of the intestine results from the habituation of the cells, which have eliminated the first poison. A similar immunity was observed by injection of putrid beef-broth. The author concludes that Eberth's bacillus, having penetrated the organism, fabricates a toxin, which acts on the nervous system and brings about death by collapse; in addition to general toxic effects this toxin acts peculiarly on the mucous membrane, especially of the intestine, and thus causes the familiar lesions. All these anatomical alterations produced by the toxin, and independently of the virus, are accompanied by symptoms presenting very close analogies with those of human typhoid. In experimental, as in human, typhoid, Eberth's bacillus is not found in the

intestinal contents; this fact militates against the idea that the disease is a process, infectious in origin, localized in the intestine; this absence of Eberth's bacillus in the intestine is to be explained by two circumstances: first, that typhoid fever is an infection of the lymphatic system only; secondly, that, directly the poison begins to act on the intestinal walls, the bacteria coli become pathogenic and increase so enormously as to assimilate all other forms. Given the great toxic anatomical alteration of the intestinal mucous membrane, the bacteria coli constitute the first cause of the secondary infections and localizations so frequent in the disease. If the animal is partially vaccinated the bacteria coli emigrating from the intestine produce only local effects; animals vaccinated against Eberth's bacillus are also vaccinated against the bacteria coli, which, therefore, tend to disappear from the intestine, being probably destroyed by the epithelial cells of the mucous membrane, which thus act toward it like all other phagocyte cells of the vaccinated organism.

The Urine in Enteric Fever.—In a lengthy study of the urine in enteric fever, Oriou⁹² states: 1. The more elevated the temperature, the more active the oxidation, the fever masking a serious condition, or complicated by the so-called typhoid condition. 2. In the three clinical forms, benign, moderate, and grave, whether fatal or not, as well as in complications of the typhoid state, an increase of fever is followed by an increase—if not proportional, at least parallel—of oxidation. 3. Any deviation from this principle is readily explained by one of the numerous causes capable of modifying the laws of organic exchange. 4. The typhoid state, far from owing its origin in every instance to retention in the organism of the products of combustion, often coincides with an abundant elimination of these products. Robin⁹² agrees with all these statements but the last, believing that during the typhoid condition the oxidations are diminished. John Hewetson⁸⁵⁸ examined the urine of two hundred and twenty-nine enteric-fever patients within four years, and concludes that its general physical and chemical characteristics do not differ much from those in other acute infectious diseases. Although Ehrlich's diazo reaction cannot be said to be pathognomonic, being absent in some undoubted cases, while it is occasionally met with in a number of other diseases, still its occurrence in the urine, when

other suspicious symptoms are present, is of definite diagnostic value. The marked increase in the quantity of toxic substances eliminated in the urine, during the course of a case of enteric fever while cold baths are being used, is of interest as offering a possible explanation of some of the benefits derived from the Brand method of treatment. The presence of albumin in the urine, during the course of enteric fever, while of very frequent occurrence, cannot be said to be a constant phenomenon. When present it is generally found as a faint trace, but may exist in large quantities associated with many tube-casts and occasionally with blood; there are then all the clinical features of a severe nephritis. This, however, may completely disappear, and would seem to be less frequently the cause of a fatal termination than has been generally believed. The pathological changes found in the kidney in enteric fever possess no characteristic or specific feature, being, in fact, those which may occur in any acute infectious disease. The evidences of parenchymatous changes in the kidney are constantly present, varying in intensity from slight degeneration to actual necrosis and abscess-formation, and these are not infrequently associated with the presence of "lymphomatous" nodules. The lesions in the kidney present no etiological unity; but, just as degenerative and inflammatory changes in the other parts of the body may be due to a variety of micro-organisms, so the renal lesion in this disease may be due to the typhoid bacillus itself, or to micro-organisms which enter the circulation through the diseased intestinal wall, or sometimes to bacteria which reach the kidney by a direct process of extension from the lower urinary passages; while there is good reason to believe that the toxic product of the bacteria themselves may cause most extensive lesions.

Infection and Spread.—Wherever the typhoid virus exists everything we come in contact with may convey it to our system,—the air we breathe, the water we drink, the bread we eat, the dust that fills our nostrils and our lungs. Apart from the atmosphere there is no imaginable medium by which the morbid matter could be distributed from a few sick persons to every quarter of a city except the common water-supply. Decornet ⁵⁵ Mar. 10, '94 states that the town of Chaumont (Haute Marne, France) had for years been desolated by enteric fever, which disappeared as soon as drinking-water was obtained from new sources. According to Cyrus

Edson, ⁵⁹_{May 5, '94} Grand Forks, North Dakota, with 10,000 inhabitants, is situated on a tributary of the Red River; its water-supply is taken from the stream on which it is situated, at a point well above its sewage discharge, which is also into the stream. Sixty miles above Grand Forks is the town of Crookston, with a population of about 4000. Just prior to November 17, 1893, several cases of enteric fever occurred in the latter place. As a precautionary measure, the sewers of Crookston were thoroughly flushed out, and a number of cess-pools as well, with water, causing a discharge into the river of a large body of contaminated water. The river at the same time was coated with thin ice. About thirty days later, approximately the period of incubation of enteric fever plus the time required for the infection to flow sixty miles, enteric fever broke out in Grand Forks.

The occurrence of enteric fever at Havre, France, was attributed to polluted drinking-water by Gilbert ¹⁴_{Aug. 11, 16, '94} and Brouardel. ¹⁰_{Apr. 17, '94} An epidemic at Paris, ¹¹_{Mar. 21, May 2, '94} notwithstanding all official disclaimers, was proven to be due to the introduction of contaminated drinking-water from the Vanne River. The same cause was found for an epidemic at Bordeaux, ¹⁸⁸_{July, '94} while Charles Cary, ¹⁷⁰_{June, '94} Rogers, ⁸¹_{Nov., '93} Guibert, ³⁴⁶_{Nov., '93} J. Taylor, ²_{Dec. 23, '93} W. T. Sedgwick, ⁶¹_{Oct. 21, '93} all describe epidemics originating from drinking-water. Heyer, ²⁴³_{Sept., '94} in a report on an epidemic at Bel-Abbès in 1893, remarks that the jails in the barracks of the troops are badly ventilated, insufficient, overcrowded; four men are often put in one cell. Bedding and food leave much to be wished for; while the buckets are a source of stench. Jails intended for eighty men often contain one hundred and twenty or one hundred and thirty. Yet it is very rare to see a case of enteric fever among them because they receive none but filtered water.

Dufaud ²⁴³_{Nov., '93} reports an epidemic at the artillery barracks of Tunis in 1892. Whenever the ground was turned over for construction purposes or for other work, the intensity of the disease was augmented. Near Montclair, N. J., ⁵⁹_{June 9, '94} milk from a badly-kept dairy caused the outbreak of an epidemic of enteric fever, 107 cases, with 14 deaths (13 per cent.), occurring. The teats of the cows had been washed with contaminated water. W. C. Dabney ¹_{Sept. 30, '93} relates that an outbreak of 14 cases at the University of Virginia was the object of careful inspection and

research. No cause could be found, but minute inquiry into the milk-supply disclosed facts similar to the preceding.

Reich, of Oels, ⁴_{July 23, '94} states that three villages with 150 homesteads were scourged by an epidemic in 1891. All the patients had taken raw buttermilk from an establishment where whey was prepared. Only one house, apparently under the same conditions, was spared throughout the whole epidemic, because the owner never allowed his family to take the buttermilk unboiled, having noticed that it caused diarrhoea. There were 92 cases, with 11 deaths. Either the water of the well at the establishment was infected or some one of the many peasants brought infected milk, which was mixed with the good and so caused the spread of enteric fever.

Giuseppe Alessi ⁵⁰_{Feb. 15, '94}; ²_{June} studied the influence of putrid gases as predisposing causes in enteric fever. Rats, guinea-pigs, and rabbits were confined in boxes with perforated bottoms, and these boxes were then placed over open privies or cess-pools, or over receptacles containing the evacuations of the animals. Notwithstanding that they continued to eat well, the animals lost their liveliness and gradually pined. They were inoculated in this state with a small dose of typhoid bacillus, with the result that they died in from twelve to thirty-six hours. Examination showed signs of hæmorrhagic enteritis, swollen Peyer's patches and spleen, and typhoid bacilli in the blood, liver, and spleen. The same dose had no effect upon the majority of the control animals. These experiments go to show that animals are rendered highly sensitive to the typhoid bacillus by previous inhalation of the gases of putrefaction. Alessi next investigated the isolated action of the various gases produced in putrefaction to ascertain if any one were capable of creating the predisposition referred to. The result was negative in such cases. The same held good as regards certain mixtures of these substances. W. E. Longshore, of Hazelton, Pa., ⁵⁴⁷_{Oct., '93} publishes a paper the principal object of which is to show that sewer-gas is not the most common nor the most fruitful cause of enteric fever. It may not convey the germ of this fever, but it has a poison of its own equally terrible in its consequences.

The period of incubation is generally considered to be twelve or sixteen to thirty days. Thirty days after boiled water was sup-

plied in an epidemic at Lerida, Spain, no new cases occurred, according to J. del Castillo.⁴⁴¹
Mar. 15, '94 Wm. H. Pearse²⁶
Mar. 1, '94 saw a case develop on board a government emigrant-ship, fifty days from England.

Diagnosis.—Obraztsow, of Kiew,⁶⁷³
Mar., '94 calls attention to the value of palpation of the ileum and mesenteric ganglia in the diagnosis and prognosis of typhoid fever. For the past four years he had observed, in examining the right iliac fossa in cases of typhoid fever, that in 60 per cent. of the cases an intestinal loop can be felt beyond the cæcum, about the size of the index finger, of varying consistence, and at the level of which pain and gurgling were localized. This loop, situated at the base of the right iliac fossa, is from six to eight centimetres in length, directed obliquely from above below, from without inward, its upper end being in relation with the internal part of the exterior surface of the cæcum, its lower end near the outer edge of the right abdominal muscle. A line from one antero-superior iliac spine will divide this loop in two equal parts seven centimetres from the right iliac. Autopsy verified the author's belief that this loop was none other than the terminal point of the ileum where it joined the cæcum; and clinical observation has shown that, the larger and more painful this loop, the graver the prognosis of the case. The author has also observed, at the base of the abdominal cavity, in the region bounded by the external edge of the right muscle on the inside and the internal edge of the ascending colon on the outside, several mesenteric ganglia of the size of a plum or a nut. These also indicate a grave prognosis. After examining several hundred patients Obraztsow feels warranted in declaring these two signs to be of the greatest value in the diagnosis and prognosis of the disease, although their absence does not exclude typhoid fever. They are also of value in the differential diagnosis between typhoid fever and the typhoid forms of acute tuberculosis. In palpating the ileum the right hand is held perpendicularly to Poupart's ligament, seven centimetres from the right antero-superior spine of the ileum, at the point where the intestinal loop meets this line. The palpation should be made with delicacy, in order to avoid contraction of the muscles of the abdominal wall. The patient should, at the same time, make deep inspirations. To find the mesenteric ganglia the fingers of the right hand are

placed near the external border of the right abdominal muscle parallel with the umbilicus, carefully palpating the left half of the lumbar vertebral region, below and outside the right abdominal muscle; the angle formed by the ileum and the colon will show the hypertrophied ganglia of the mesentery. As the palpation of these points is often rendered difficult by the sensitiveness and swollen condition of the large intestine, it will be seen that the greatest delicacy of touch is required. Wolowsky⁵⁸⁶_{No.1,'94} remarks that the mesenteric glands may be palpated in almost every case of the disease by using Glénard's method; while Wagner²¹_{Mar.10,'94} and Geissler³_{Jan.17,'94} warn against the possible danger of this procedure and doubt its prognostic value.

Cases of enteric fever without intestinal lesions are reported by Karlinski⁸⁴_{Mar.,'94} and by du Chazal.⁴²⁰_{Apr.7,'93} The last case presented for three weeks all the classical symptoms of enteric fever and finally died of bilateral pneumonia. The intestines and mesenteric glands were perfectly intact. Bacteriological examination of the spleen demonstrated the presence of typhoid bacilli in pure culture. Leaby, of Chicago,¹³⁹_{Oct.,'93} relates the case of a woman who had all the classical symptoms of enteric fever. The right iliac fossa contained more than a pint ($\frac{1}{2}$ litre) of encysted pus, the appendix was almost entirely destroyed, and the cæcum somewhat involved. In the small intestine there were a number of small cicatricial strictures.

Symptoms, Complications, and Sequelæ.—L. B. Allen, of Humboldt, Neb.,¹⁸⁶_{Apr.,'94} relates the fatal case of a young man who showed mental hebetude and delirium from the very beginning until twenty-four hours before death, when coma supervened. Besides the general symptoms there was a strong rheumatic element. Until the fourteenth day of the sickness the thermometer ranged from 102° to 104° F. (38.9° to 40° C.). On that day there was a remission of fever, in a few hours a chill, after which the fever increased. Then came a decline, again a chill, and again raging fever with profuse perspiration until the end. Energetic treatment had no effect; four days before death the auxiliary temperature was 110° F. (43.3° C.) and even higher. Osler⁸⁵⁸_{v.4, No.1} reports eighteen such cases where the temperature during convalescence ran up again as high as 103° F. (39.5° C.). This elevation of temperature may be due to anæmia, to boils, to phlebitis, and is

not to be regarded as a relapse. Osler's patients all recovered. One cause of the fever is a spread of the intestinal lesions when fresh Peyer's patches have been involved; another cause is the spreading and deepening of the ulcers themselves.

Loustaud Châtenet ²⁴_{Jan. 28, '94} states that in marshy countries intermittent fever often complicates enteric fever, and in the beginning it may be very difficult to distinguish the two diseases from each other. The complication has no noticeable influence on enteric-fever mortality. Osler ⁸⁵⁸_{v. 4, No. 1} reports three cases in which there was a definite history of malaria within a few months of the onset of enteric fever. Another patient was admitted with ordinary tertian intermittent. After six days he had no more fever and the malarial parasites had disappeared from the blood. Enteric fever then developed, the man in due time making a good recovery.

Gilman Thompson ⁵_{Aug., '94} reports two cases. One was admitted with all the clinical symptoms of enteric fever, continued fever for seven weeks, and hæmorrhage from the bowels. On the thirteenth day there was a severe chill before the hæmorrhage, lasting three-fourths hour, and temperature 106.6° F. (41.5° C.). There were two more chills during the third week, the blood containing malarial plasmodiæ in large quantities. Quinine was given and the patient recovered. The plasmodiæ became active during the height of the typhoid disease. In two other cases the malarial symptoms remained latent until the force of the enteric fever had been expended. In the first case the enteric fever, at first very mild, was immediately greatly aggravated by the malarial complication. It is evident from the first case that the two diseases may co-exist.

Loison and Simonin ²⁴³_{Oct., '93} conclude that there is no antagonism between enteric fever and tuberculosis. In one hundred and fourteen typhoid cadavers tuberculosis was found five times. Typhoid fever may hasten the manifestations of pre-existing tuberculosis, or the latter may remain latent and only be discovered by autopsy. The microscope must resolve doubtful cases. In a case of Sarda and Villard ¹⁰⁰_{Nov. 30, '93} the diseases co-existed.

Robin and Leredde ³⁶⁰_{Sept., '94} state that articular rheumatism may complicate the typhoid condition, the typhoid symptoms being of short duration and subsiding after the administration of salicylate of soda. The co-existence of articular rheumatism and enteric fever has not yet been demonstrated. Potier ¹¹⁸_{May, '94} describes a case

of polyarthritis appearing during the third week of enteric fever, with severe pains, first in the limbs, then in the joints, and disappearing after some time.

Pagliano, of Marseilles, ⁹²_{July 10, '94} believes that high temperature, cerebral œdema, meningitis, and the infection itself are direct causes of intellectual disturbances in typhoid fever. The diagnosis is generally easy, as they are mostly accompanied by a number of other symptoms.

Aschaffenburg ⁸⁶⁶_{June, '94} reports the case of a woman of 30 years, who was brought to the Heidelberg Psychiatric Clinic the day after being taken suddenly ill. She presented lively motor excitement and rapid ideation, with hallucinations and mental confusion of a severe grade. There was also a peculiar stupor resembling drunkenness. No fever. Nevertheless, the diagnosis of typhoid fever with initial delirium was confirmed by the autopsy. From an experience of seventeen cases the author divides the initial delirium in enteric fever into two forms, which are united by transition forms. The first variety, resembling the "*conceptions délirantes*" of the French, is characterized by a dreamy, delirious state, the second by great excitement and complete confusion of ideas. He considers it as an intoxication delirium. The abnormal course of the fever has been declared by Gerhardt to be an intoxication symptom. Nissl, who examined part of the cortex in this case, reported that the ganglion-cells were in all stages of dissolution. There was rarefaction of the nuclei, succulence of the glia-cells, and karyokinesis of some of their nuclei.

Stuhlen ⁴_{Apr. 9, '94} describes a case of meningitis complicating enteric fever in a man whose wife and children were already suffering from the fever. After a few days of malaise he complained, on July 28th, of headache, shivering, and constipation. He was admitted three days later. On August 1st there was blood in the stools; stupor, with restlessness and delirium, supervened. Next day sudden collapse, from which he rallied, but the stupor persisted. On August 4th rigidity of the neck was observed and slight icterus. He died about the fourteenth day. Besides the lesions in the alimentary canal there was purulent cerebro-spinal meningitis. Plate-cultures showed colonies having all the characters of those of the typhoid bacillus. Tictine, of Odessa, ⁹⁹⁶_{Mar. 26, '94} publishes two cases with meningeal complications. Post-mortem showed the ordinary

lesions and serous meningitis in one case and purulent meningitis in the other. He trephined some rabbits, inoculated under the dura the bacilli found in the pus of the second case, and saw (in nine or ten days) a cheesy mass, formed of granulous detritus and pus-cells, containing in several specimens the Eberth bacillus, and never any other microbe. Tictine has seen two other cases of abscess in enteric-fever patients. He made sure that this suppuration was due to Eberth's bacillus itself, and not to its secretions.

Melville ²²_{Dec. 6, '93} describes the case of a young English soldier in India. After a few days of sickness recurring paroxysms of furious struggling came on. Gradually these became almost continuous, the only cessation being from exhaustion. They were accompanied by delirium, which later on became constant. Death occurred on the seventh day after his admission into the hospital. Post-mortem showed ulceration of Peyer's glands, and on the under surface of the brain a tumor, about the size of a walnut, occupying and covering the space between the medulla and pons and the right temporo-sphenoidal lobe, involving the roots on the right side and loosely attached to the sheaths of the fifth nerve, portio dura and mollis of the seventh, glosso-pharyngeus, pneumogastricus, spinal accessory, and hypoglossus. It consisted simply of cells, similar to leucocytes, with little stroma between them, and appeared to be either inflammatory or syphilitic in origin. No micro-organism. The microscopists regarded it as of recent growth.

P. Cauer, in giving the history of his own case, ³¹⁹_{Sept. 16, '94} relates that he suffered the following complications and sequelæ: Pleuritis, lung-abscess, threatening heart-failure, and complete paralysis of both legs, which lasted a long time; but he eventually made a perfect recovery.

In 1889 Gibney, of New York, described a sequela of enteric fever which he called the "typhoid spine," evidently for want of a better name. He published four cases, which were much discussed. Wm. Osler ⁸⁵⁸_{V. 4, No. 1} adds four cases more, in four men aged 21 to 30 years. It will suffice to reproduce one, in order to give an idea of them: Severe attack of enteric fever, with relapse; about three weeks after defervescence, pain in the back and hips, usually of shooting character, beginning at the small of the back and extending up along the spine; paroxysms of pain in the abdomen,

returning after a certain period of relief; gradual subsidence, weakness in the back remaining, and pain when turning in bed. Plantar and other skin-reflexes increased, knee-jerks present. A similar case is published by Joseph N. Study ⁵⁹_{July 23, '93} and two more from the wards of the Westminster Hospital. ⁶_{Aug. 18, '94} All recovered.

Gilbert and Fournier ¹⁴_{July 25, '94} had a case of enteric fever which, on the tenth day, was complicated by double suppurative parotitis. The pus contained, in a pure state, the staphylococcus aureus. The abscesses quickly healed. Two months later the woman was admitted with biliary colic. The parotid abscesses were due to ascending infection. Their quite early occurrence and bilateral character are uncommon. Biggs ⁵⁹_{Apr. 23, '94} presented the history and anatomical specimen of a case with extensive ulceration of the cæcum and colon. The one which caused peritonitis and death was located on the anterior wall of the cæcum, at about the level of the ileo-cæcal valve. No perforation had occurred. Cultures from the spleen showed bacilli possessing all the morphological and biological characters of Eberth's bacillus; cultures from the peritoneal exudation showed streptococcus pyogenes, with bacilli which had, apparently, the characteristics of the bacteria coli. Arnaud ²⁴³_{Dec., '93} reports fourteen observations of extensive ulcerations of the large intestine, the pathogeny of which was not very well established. Berthoud ²⁴³_{Jan., '94} also reports two cases. All of these patients died. Osler ⁸⁵⁸_{V.4, No. 1} publishes two cases which died of progressive asthenia. Meslay ⁷_{No. 11, '94} relates a fatal case of enteric fever in which the entire follicular system was invaded, the end of the ileum for six centimetres being but one ulceration; there were twenty-four ulcers in the cæcum, an ulcer of fifteen centimetres in the appendix, and ulcers in the large intestine; lenticular roseola had been general.

Adami ²⁸²_{Mar., '94} relates the case of a patient who entered the hospital with empyema, for which an operation was performed, the empyema healing. He died with symptoms which resembled tuberculosis. Autopsy revealed the lesions of typhoid in the ileum, with perforation and hæmorrhage. Allan, of Glasgow, ²¹³_{Feb., '94} says that restlessness without obvious cause, a fall in temperature; soft, quick pulse; pallor of the lips and sighing respiration, and a curious smell about the patient "suggestive of fresh earth and raw beef" give warning of hæmorrhage.

Newton¹⁰⁵²_{V.5, No.6} reports the case of a lad, 17 years old, in whom perforation was diagnosed, cœliotomy advised, but not accepted. Four weeks later an abscess between the scrotum and anus appeared. Through the opening a probe was passed into the abdominal cavity for a distance of ten inches. Recovery took place. Burton Fanning⁶_{June 30, '94} communicates the case of a young woman in whom perforation occurred. In the sixth week the fever began to fall; then she had a relapse, with eighteen days of fever. She recovered, and during convalescence had an ulcer on the anterior pillar of the left fauces the size of a pea. E. W. Goodall, of Homerton,⁶_{June 23, '94} treated a young woman who died within ten minutes after perforation, which occurred three feet and a half above the valve.

Cayley and Bland Sutton²_{Mar.17, '94} contribute the case of a man of 25 years. Perforation supervened about the twenty-fourth day of an apparently mild attack. Cœliotomy was performed, and a perforation was found twelve inches above the ileo-cæcal valve. The ulcer was excised, and the edges of the mucous membrane were drawn into apposition by a continued silk suture, the serous surfaces by eleven Lembert sutures, the peritoneal cavity irrigated, etc. The man lived six days longer. Battle, in the discussion, said that twenty cases of this kind had been recorded,—all fatal.

Lucatello⁹_{May 26, '94} saw a case which, in addition to the classical lesions, there existed reddish-gray hepatization of the upper lobe of the right lung and catarrhal condition of the larynx. The spleen, when punctured, disclosed the presence of the typhoid bacillus on the tenth day; in the saliva and laryngeal secretions it was met with on the twelfth day. The presence of the organisms in the larynx, sometimes resulting in ulceration, predisposes to the lodgment of other micro-organisms, including the pyogenic ones, and through these the secondary processes are brought about. Wm. Gayton⁶_{May 5, '94} had a case complicated with diphtheria, which made its appearance on the thirteenth day. Tracheotomy was performed and recovery ensued. Geo. A. Brown²⁸²_{June, '94} reports a case with double pneumonia, ending favorably.

Dicrotism of the pulse, according to Chrétien,¹⁵_{July, '94} is the more marked the lower the arterial tension and the sharper the pulse-wave. Diminished blood-pressure is the chief cause. It may foretell intestinal hæmorrhage by the re-establishment of a higher

arterial pressure, together with an enfeebled systole. In a case of Eroschewsky's ⁵⁷¹_{Nos. 4, 6, '93} the pulse sank to 40 to 38, the temperature being 38° to 39° C. (100.4° to 102.2° F.). He accounts for this pulse by specific action of the virus, supposed fatty degeneration of the heart, and cerebral anæmia.

Galliard, ¹⁴_{June 17, '94} referring to two fatal cases of myocarditis witnessed in the course of enteric fever, and in which the first sound of the heart had disappeared several days before death, said that he had treated recently a similar case, but which recovered after a prolonged convalescence. It was that of a young girl, aged 17 years, suffering from enteric fever; and, during the illness, the first bruit could no longer be heard at the base. The face and extremities were cyanosed, but symptoms of cardiac collapse and syncope were absent. The patient was treated by cold baths. Dufour, ⁷_{No. 22, '93} in one case of enteric fever, found in the small intestine a pack of ascaris lumbricoides. Degeneration of myocardium was present.

Haushalter ⁹_{Apr. 21, '94} notes that thrombosis of the vein in one case of phlegmasia alba dolens was directly due to the action of typhoid bacilli. A girl, 21 years old, died in the sixth week of an attack of enteric fever, and there was found a fibrinous clot in the left crural vein. Bacteriological study of the walls of the vein and clot, as well as of the liver and spleen, disclosed the exclusive presence of typhoid bacilli.

Purpura hæmorrhagica followed one case of abortive enteric fever under the treatment of W. H. Thomas. ¹⁷⁶_{June, '94} Silvestrini ⁵⁸⁹_{Aug. 24, '94} observed in a girl, two days after the appearance of typical roseola on the breasts and on the abdomen, an outbreak of erysipelas on the face. The blood and the serum of the vesicles showed typhoid bacilli. In another girl with enteric fever and erysipelas of the face the blood and the contents of the small vesicles showed the presence of the same bacilli.

L. Bodin ¹_{Aug. 11, '94} reports a case of nephritis in typhoid, and remarks that it supervenes only in patients with the classical form of the fever and generally during the second week. Albumin appears suddenly, with general phenomena which, when violent, may be called acute uræmia and which almost always terminate fatally. In another form the urine is diminished and contains blood, while the uræmic phenomena are less intense; a still more

frequent, but less severe, form is characterized by aggravation of the general symptoms of enteric fever. Microbes are generally found in the urine,—streptococci and staphylococci (the latter are by far the more common),—with or without Eberth's bacillus. All these microbes are found in the intestinal canal and probably gain their entrance into the blood through the intestinal ulcerations; so that the nephritis is most commonly secondary. The bacteriological study of Bodin's case revealed in the urine, from beginning to end, a great abundance of bacilli having all the characteristics of Eberth-Gaffky's bacillus.

Klemm, of Riga, ³³⁶ has studied the typhoid affections of the bones, which end with resorption, ossification, or liquefaction. Central osteomyelitis is especially rare. He regards typhoid suppuration of the marrow (ordinary infectious myelitis) as a mixed infection due to simultaneous colonization by the two species of microbes. In two cases of osteomyelitis of the femur, with serous or bloody-serous, non-suppurative exudation, he obtained typhoid bacilli in pure cultures. Quincke ⁴ _{Apr. 9, '94} says that, in eight cases of typhoid inflammation of bones observed at Kiel by Ebermaier, the inflammation focus showed typhoid bacilli in two cases; one was suppuration of second metatarsal; in the other apparent fluctuation led to incision of the periosteum of the shin. Only bloody serum escaped. The bacilli get into the periosteal foci through the marrow and produce typhoid colonies. In the red marrow typhoid bacilli are as constantly found as in the spleen, though perhaps not quite so abundant. Wherever, in a case of suppuration, no typhoid bacilli are found, Klemm accounts for it by supposing that the pyogenous cocci have remained and the typhoid bacilli have perished.

Post-typhoid cold suppurations are considered by Rispal ¹⁰⁸⁸ _{Nov. 19, '93} and Vidal and Chantemesse. ¹⁴ _{Nov., '93} These suppurations, coming on during the decline of the fever or in convalescence, are due to a pure state of the common microbes of suppuration, to Eberth's bacillus (likewise in pure state), or, finally, to the association of Eberth's bacillus with the ordinary pyogenic microbes. Of the second class about forty cases have been published. The favorite seat is in the bony tissue; next in the serous membranes, meninges, pleura, peritoneum, and synovial sheaths; then the thyroid gland and testicles. The spleen is the only parenchyma in which

they have been found. In some cases no general symptoms were present, no fever, and the evolution is slow. G. Sultan⁶⁹_{Aug. 23, '94} contributes a remarkable case, that of a servant-girl, 35 years of age, who, six years before, had had enteric fever. During convalescence a suppurating swelling developed on the right collar-bone and another swelling in the axillary line over the twelfth right rib. Both discharged freely, healed, and opened again alternately until, in each of the two places, a small sequestrum was detected and removed. The pus of the lesion of the collar-bone showed Eberth's bacillus. The pus of the rib was not examined.

Rob. L. Nourse⁵⁹_{Apr. 28, '94} describes the case of a little girl of 9 years who, about the fourth week of the fever, had five cold abscesses, together with a rise of temperature to 104° F. (40° C.), rigors, and alternating profuse perspiration. She recovered. G. Banti, of Florence,⁵⁸⁹_{Sept. 6, '94} gives the history of a woman of 33 years, admitted to hospital with enteric fever and dying on the thirteenth day of septicæmia. Eberth-Gaffky's bacillus was found in large quantities. There was, in this case, no intestinal localization.

Gangrene of the mouth is reported by A. N. Montgomery, beginning¹⁶_{May, Aug., '94} on the forty-first day, inside the right cheek. A large slough came away readily, the opening in the cheek closed, and the boy recovered.

Sarda²⁰³_{Feb. 1, '94} narrates the case of a boy of 12 years who developed symmetrical gangrene during the third week. There were epistaxis, bed-sores, and phlyctænæ on the left ear. Recovery occurred.

Durand²¹³_{July, '94} cites the case of a young soldier in whom, on the twenty-third day of the fever, the lower limbs became livid, paralytic, and insensible. Gradually eschars formed and sloughing of the soft parts of both legs complicated the condition. The patient, however, regained strength as the gangrene ceased to extend, and four months later both legs were amputated and recovery took place.

Relapses.—Jaccoud¹⁴_{Jan. 17, '94} calls relapse (*réchute*) the repetition of the disease in an individual convalescent from enteric fever, and recurrence (*récidive*) the repetition in an individual who had the disease months or years ago. Recurrence commonly occurs during the second year; there may be as many as three recurrences in one person. The medium time between final deferves-

cence and relapse is three, ten, fifteen, and even nineteen days (Schultz); in one case there was an interval of fifty-three days. Jaccoud's statistics show from 9 to 10 per cent. relapses. In exceptional cases as many as five relapses were observed. Relapses are generally not so serious as the first attack, as a certain immunity has been acquired by the foregoing attack. To be considered as typical, there must be fever for at least eight days after decided apyrexia, roseola, swelling of the liver and spleen, and intestinal troubles. The observations of Podanowsky¹²⁶_{Apr. 15, '94} show, in different years, a medium frequency of relapses of 4.2 per cent. more in men than in women (45 to 20); the relapse is the shorter the longer the first attack. Stewart⁹_{Apr. 21, '94} studied fifty cases of relapse from the records of Guy's Hospital, finding constipation to be an important predisposing cause. These authors all agree that relapses are not due to a new extrinsic infection, nor are they complementary to the insufficient first attack. Stewart and Podanowsky believe in auto-reinfection by the passage of sloughs over healthy lymphoid follicles; Jaccoud thinks relapse to be due to a modality of the fever taking its evolution in two periods.

G. H. William¹⁰⁷⁷_{Nov. 22, '93} saw a case in which a mild attack was followed by a second of deadly gravity. There was a remarkable alteration in the pulse-rate, which was not over 88 in the first attack, and which in twenty-four hours after the relapse reached 120, and the day before death 134; in the relapse there was much diarrhœa, while in the first attack there had been none. Emerson²_{Dec. 30, '93} reports the case of a man who, when in full convalescence (thirty to forty days), had a relapse; about the fifty-seventh day he became convalescent again, when œdema of right leg and thigh appeared, with a pulse of 140 to 150.

Cases in which two distinct attacks of the disease occurred are reported by A. Hand⁹_{Apr. 14, '94} and Mason.⁹⁹_{Feb. 22, '94}

Enteric Fever in Children.—The disease is not rare in children, but it is often not recognized, as nervous symptoms may often obscure the diagnosis from the beginning. William B. Noyes, of New York,⁵⁹_{July 7, '94} states that in young patients the morning fall of temperature is very marked, often becoming normal. Hypertrophy of the spleen is seldom sufficiently marked to be detected in the living, the exanthem is absent in about one-third of the cases, and the intestinal lesions are not intense.

During convalescence, according to Marfan, ³¹_{Mar. 31, '94} the children sometimes grow extraordinarily in length.

Wightman ²_{May 5, '94} observed 24 cases under the age of 13 years. Three died,—1 of pyæmia, 1 of perforation (peritonitis), and 1 from exhaustion. The temperature was very rarely as high as 104° F. (40° C.). Typical spots were seen in 15 cases; constipation occurred in 10, typical stools in 3 cases only. Davis, ⁶⁴⁷_{Aug., '94} in 33 cases under 10 years, observed, in all but 3, a sudden development of the disease. Vomiting during the first days occurred in 16 cases, chill in 12 cases, diarrhœa in 11, epistaxis in 6; 3 sneezed. Liebermeister has said, however, that sneezing excludes enteric fever.

Treatment.—Osler ⁸⁵⁸_{V. 4, No. 1} says that at least 75 per cent. of enteric-fever patients recover under any and all forms of treatment, and even without the good nursing and regulated diet upon which we lay so much stress. By judicious care, by careful feeding, and by the withholding of drugs of uncertain value, fifteen additional patients in each hundred are saved, and, if any reliance can be placed upon figures, an extra 3 or 4 per cent. are saved by hydrotherapy. Nursing and diet are the essentials, to which may be added the cold bath, when possible, or cold sponging for the antipyretic and stimulating effect. Medicines are not, as a rule, indicated. No known drug shortens by a day the course of the fever; no method of specific treatment or of antiseptis of the bowels has yet passed beyond the stage of primary laudation.

F. W. Abbott, ⁵⁴⁷_{Aug., '94} in the vast majority of cases and when no complication exists, urges the giving of food at all times possible. Louis Heary ²⁸⁵_{July 20, '94} proscribes all animal food, since meat, broths, and milk constitute the best media for the cultivation of the typhoid bacilli; he substitutes fruit-acid and fruit-pulp, and vegetable infusions, such as barley-water. Waugh, ⁷⁶⁰_{Jan. 6, '94} in order to supply a substance that can be directly absorbed into the veins and be assimilated without passing through the intestinal glands, suggests egg-albumen and bovine, as fresh blood cannot be obtained at the time it is required. He speaks a good word for coffee as a stimulant, instead of whisky. J. W. Springthorpe, of Australia, ²⁸⁵_{July 20, '94} describes a new food for use in enteric and other fevers. It is sterilized hopped malt-extract, which resists very well the growth of Eberth's bacillus. An analysis showed that it con-

sists of soluble carbohydrates, peptones, parapeptones, amides, a small proportion of ash, and is rich in phosphoric and lactic acids and the extract of the hop. The carbohydrates are represented by maltose, dextrose, levulose, and dextrin, the proportion of the first three to dextrin being as three to one. The solid extract, in all, amounts to 15 per cent., much the same as good cows' milk. The ash is 0.25 and the average acidity as lactic acid is 0.15. It is estimated that there are from 8 to 12 grains (0.52 to 0.78 gramme) of lupulin in 3 pints (1½ litres) of the extract. Nothing but this food was given in forty cases, and it was found that the results were satisfactory. It has many advantages over milk. Its composition may be made definite; it is easy to keep and to administer; there is no risk of souring, no need of peptonizing, or of adding alkalies or effervescent; and it goes naturally with acids.

The sterilized hopped malt-extract is prepared as follows: Crushed English barley-malt is infused with twice its weight of water at 165° F. (74° C.) for two hours. The mash produced should be at 151° F. (66° C.). After draining, the sweetwort is run off and "sparged with water at 170° F. (76.7° C.) until the malt is perfectly extracted. It is then collected in the copper, and, when saccharification is complete, saccharose sugar is added to bring about inversion into dextrose and levulose by the diastase of the malt. The contents of the copper are now brought to the boiling-point, and, after boiling for half an hour to precipitate the albuminoids thus removable, hops are added and the boiling continued for one and a half hours. The tannin of the hops precipitates a further portion of the crude albuminoids. This wort is then run over a large quantity of raw hops to extract therefrom an additional quantity of the essential oil and other volatile constituents of the lupulin. In all, twelve pounds of hops and one and a half hundred weight of sugar are used to each quarter of malt. The extract is then bottled, corked, and put into a steam-bath at 212° F. (100° C.) and kept at that temperature for two hours. As soon as the bottles are lukewarm after removal, they are laid on their sides. If this had been done before, the vacuum formed during cooling would have given rise to an explosion. If good corks are used the filtration through them is sufficient to sterilize the entering air, and, if left on their sides, contamination does not occur. The bottles are now ready for use. On keeping, a

further precipitate is produced by the oxidation of the albuminoids; but this can be easily separated, if desired, by filtering the last portion before use. The composition of the hops is: hop-oil, 0; lupulin, 11; annin, $\frac{1}{2}$ to 2; gum, 5 to 6; and cellulose, 63 to 70. Assuming that only one-half the principle is extracted, there are $8\frac{1}{2}$ grains (0.55 gramme) of lupulin in 3 pints ($1\frac{1}{2}$ litres) of the extract.

S. Herrero ⁸¹⁴_{July 1, '94} believes that disinfection of the intestines must be the primary object, and this he obtains by castor-oil, 30 grammes (1 fluidounce); turpentine-oil, 10 grammes ($2\frac{1}{2}$ fluidrachms); to be taken in one dose in the morning on an empty stomach. This causes the temperature to fall to the normal and to remain so for some time. He then gives for two or three days iodoformized charcoal and in the evening 1 gramme ($15\frac{1}{2}$ grains) of quinine sulphate. In all cases where the treatment was commenced within the first five days of the disease convalescence is said to have been established before the tenth day. W. B. Thistle ⁵⁹_{Mar. 10, '94} believes that it can be aborted by giving calomel and then salol, 5 to 10 grains (0.32 to 0.65 gramme), every three or four hours. Forty consecutive cases without death or accident are reported by him.

Balneotherapeutics is the method of election in hospitals. Roussel ²²⁸_{Oct. 16, '93} says that the failing powers are best re-enforced by systematic bathing. Brand's method, when properly applied, certainly makes the individual much more comfortable; it is not claimed that it shortens the disease by one day. The indication for the Brand bath, according to Edw. H. Small, ¹⁶¹_{Oct., '93} is a body-temperature of 103° F. (39.5° C.). The temperature of the bath should be about 68° F. (20° C.), the bath to last ten minutes. Three hours' interval between baths is the rule. Two nurses can bathe a patient. Osler ⁸⁵⁸_{V. 4, No. 1} states that at the Johns Hopkins Hospital in Baltimore, 33 patients were treated symptomatically and yielded a mortality of 24.2 per cent.; 196 patients were subjected to the cold-bath treatment and 7.1 per cent. died. Ch. E. Page ¹¹⁹_{Apr. 21, '94} has seen a mortality as low as 2.7 per cent. by the bath treatment.

James C. Wilson ⁹_{Nov. 25, '93} reports another series of 74 cases treated by Brand's method,—this bringing the number of cases treated in the German Hospital at Philadelphia, from February,

1890, to June, 1893, up to 300. The first series (226 cases) had a mortality of 6.3 per cent., the last 10.8 per cent.; total mortality in these 300 cases, 6.6 per cent. No children were received. A great point is to commence the cold bathing as early as possible. Of those admitted before the fifth day only 3 per cent. died; in 78 cases admitted prior to the tenth day 7.7 per cent. died; and in 18 cases admitted after the tenth day the death-rate was 22 per cent. There were many cases with hæmorrhage, and 10 (13.5 per cent.) relapses. Some of the latter cases had over one hundred baths, and in one case each one hundred and fifty-one and one hundred and ninety-five baths were given.

Sir William H. Broadbent ²²_{Aug. 22, '94} mentions a system of continuous baths employed for several years by Barr, of Liverpool, hot or cold water being added as required. Forty-three patients treated by this method yielded a mortality of less than 4 per cent., and two deaths could not fairly be attributed to the fever. The initial shock of immersion can be avoided by beginning the bath with lukewarm water and gradually lowering its temperature. John Curnow ¹⁰⁷⁷_{Mar. 7, '94} begins by sponging with iced water, and, if that fail to produce the desired effect, he uses ice-packs. To carefully manage the baths is just as delicate a matter as the use of the strongest alkaloids, according to Chéron. ¹⁶⁴_{Mar. 15, '94} Most physicians give their patients all the cold and sterilized water to drink that they may ask for. Maillard, of Geneva, ⁹²_{Mar., '94} gives his patients from 5 to 6 litres (quarts) of water to drink daily during the entire febrile period. No contra-indication has been found to this treatment, which causes progressive lowering of temperature, disappearance of dryness of tongue and mouth, and nervous, circulatory, and renal phenomena. By the formation of large quantities of uræa, eliminated by abundant diuresis and profuse perspiration, the renal functions are soon re-established and albuminuria rapidly disappears.

Considering the difficulties of cold bathing in private practice, Caldwell Stephen ²_{Jan. 20, '94} has invented a kind of hammock or swing, suspended on shears, to lift the patient into and out of bed and bath. Russell Bellamy ⁵⁹_{Aug. 25, '94} uses a steel mattress or grate, placed over the bath-tub, to be lifted and lowered by machinery; and Wm. B. Noyes proposes putting the patient on a rubber blanket and pouring water on him with a watering-pot and a sprinkler.

Elmer Lee, of Chicago, ⁸⁰¹_{Apr. 28, '94} besides the cold baths, insists on copious irrigation of the bowels twice a day during the first week of illness, and after this once a day until convalescence. W. S. Strode ¹¹⁵_{Sept. 15, '94} and James Samson ¹⁸⁵_{Oct., '93} confine their treatment to cold sponging associated with the use of drugs, and Lindner ⁴¹_{Dec. 9, '93} prefers to use lukewarm baths with cold affusions and wet packs. Eliot, of New Haven, ¹_{Nov. 4, '93} advises calomel, 7 to 10 grains (0.45 to 0.65 gramme), on alternate days, and, after four doses have been taken, iodine and carbolic acid, in a dilute form. Tison, of Paris, ⁵⁹_{May, '94} recommends the internal and external use of lysol, as a general and especially an intestinal antiseptic. Hiller, of Breslau, ⁵⁰_{Apr. 1, '94} in looking for an intestinal disinfectant that would not act before reaching the typhoid bacilli, finally chose cresol with olive- or castor- oil and soap, which form an emulsion, to be given in gelatin capsules. Anderson ²¹³_{July, '94} uses salol with chlorodyne and lac. bismuth. Guaiacol externally was employed by Da Costa, ⁹_{Jan. 27, '94} who was highly pleased with it. The fever-heat went down, even to normal. No other effect was noticed, except on the temperature and delirium.

William L. Stowell ⁴⁰_{Dec., '93} recommends sponging and naphthol or salol with quinine. Maximowicz ⁷_{Apr. 7, '94} has employed α -naphthol with success, and maintains that it is a more active bactericide and less toxic agent than β -naphthol. It was continued after the temperature had been normal for three or four days. A good formula is: α -naphthol, $2\frac{1}{2}$ to 4 drachms (10 to 16 grammes); bismuth salicyl., $1\frac{1}{2}$ drachms (6 grammes); pulv. cinnam., 1 drachm (4 grammes); in 20 parts, 4 to 6 a day. When there is pronounced meteorism and severe abdominal pain, he gives α -naphthol, $2\frac{1}{2}$ drachms (10 grammes); bismuth salicyl., $1\frac{1}{2}$ drachms (7 grammes); pulv. rhei., 1 drachm (4 grammes); extr. belladonna, 3 minims (0.20 gramme); in 20 parts, as above. Petresco ⁸¹⁴_{June 15, '94} has treated 647 cases with β -naphthol, alone or associated with quinine sulphate, the former in doses of 45 to 60 grains (3 to 4 grammes) daily, and the quinine in daily doses of 15 to 30 grains (1 to 2 grammes) in 12 cachets at hourly intervals, this dose being repeated every day until recovery. Kirchberg ¹⁰⁰_{Sept. 11, '94} also employed β -naphthol in 131 cases, with 14 deaths. Lactophenin, $\frac{1}{2}$ - to 1-gramme ($7\frac{3}{4}$ to $15\frac{1}{2}$ grains) doses in starch capsules, up to 6 grammes ($1\frac{1}{2}$ drachms) daily, if necessary, according to indica-

tions, is recommended by von Jaksch. ³¹⁹_{No. 11, '94} Some patients took the maximum dose without discomfort, the fall of temperature lasting for several hours and the following exacerbation being unaccompanied by rigors. The urine gives the paramidophenol reaction.

As an intestinal antiseptic Allen H. Kelch ²²⁴_{Oct. 21, '93} uses sulpho-carbolate of zinc, 4 ounces (125 grammes); elixir calisaya and phosphates, 1½ drachms (6 grammes); a teaspoonful every four hours. C. M. Smith ¹⁸⁶_{July, '94} uses the same remedy in pills of 2½ grains (0.17 gramme) each, one every two hours until the alimentary canal has been rendered antiseptic, which is determined by the stools. Boric acid is employed by L. Tortchinsky, ¹_{Dec. 10, '93} who gives a dose of castor-oil with a few drops of turpentine; then boric acid, from 12 to 15 grains (0.78 to 1 gramme), three or four times a day. He combines it sometimes with small doses of acetanilid, quinine, naphthalin, or salol.

R. H. Quill ²_{Apr. 28, '94} ⁶⁷³_{July} advises the following methods of treatment: To begin, 3 grains (0.2 gramme) of calomel at bed-time, repeating dose twice at few days' intervals. Following mixture: R̄ Acid. carbol. pur., ʒxxxvj (2.33 grammes); spt. chloroformi, ʒij (8 grammes); tr. cardamom. co., ʒiij (12 grammes); syrup. hemidesmi, ʒij (8 grammes); aquæ chloroformi, ad ʒxij (373 grammes). M. et ft. mistura. Sig.: The carbolic mixture 1 ounce (30 grammes), with an equal quantity of iced water, every two hours as directed. Five doses of the mixture to be given on the first day, every second hour; seven doses on the second day; ten doses on the third and following days until distinct improvement is observed in the general condition of the patient, with fall of temperature. Doses then to be gradually reduced to seven, five, and three in the twenty-four hours until medicine is fully abandoned

W. F. McNutt ⁴⁵¹_{June, '94} makes use of tr. ferri chloridi, in glycerin and water, 10 to 30 drops every two to four hours, beginning as soon as enteric fever is recognized. He often adds $\frac{1}{50}$ to $\frac{1}{100}$ grain (0.0013 to 0.00065 gramme) of corrosive sublimate to each dose. The use of hydrogen peroxide, 20 drops of a reliable 15-volume solution every three hours, well diluted, is favored by M. A. Clark. ¹⁰⁵⁸_{June, '94} William Donovan ²_{Feb. 3, '94} prefers sulphur, as it remains an antiseptic in its passage through the intestinal canal. He gives

20-minim (1.3 grammes) doses of sulphurous acid, 2 grains (0.13 gramme) quinine, and 2 fluidounces (62 grammes) aq. chlorof. every three hours. William V. Wilson, of West Haven, Conn., ¹⁷⁶_{Feb., '94} testifies to the antiseptic effect of tr. baptisiae (wild indigo), 1 drop every two or three hours.

Beverley Robinson ⁵⁹_{Apr. 23, '94} has satisfied himself that the action of purgatives is not injurious in typhoid fever, and quotes several champions of this treatment, the purgatives employed being Seidlitz water, castor-oil, and calomel. One of them must be given every day. J. M. Deam, of New Carlisle, O., ²³³_{Sept., '93} recommends cathartic doses of podophyllin until the patient is well, together with Fowler's solution and hot alkaline sponge-baths. Edw. M. Fuller, ⁹⁹_{Aug. 16, '93} to combat bacterial infection and to secure effective depletion, gives a Seidlitz powder every two to four hours, and, when good operation of the bowels has been secured, a wineglassful of Dunbar's liquid magnesia every two hours, or every four hours if more than two operations are obtained.

Thomas Shaw ²⁰²_{Feb. 10, '94} uses quinine and aconite; Norment ⁷⁸⁶_{May, '94} gives quinine and chlorate of potash. Strychnine is favored by Washburne ¹¹⁵_{Jan., '94} as a nerve-tonic, $\frac{1}{40}$ to $\frac{1}{60}$ grain (0.0015 to 0.0011 gramme) at intervals of four hours. Turpentine is recommended by James D. Morgan, ⁸¹_{Apr., '94} Royer, ¹⁹⁹_{Sept., '94} Fitch, ¹⁰⁶³_{Nov., '93} and either alone or with acids or with castor-oil and bismuth subnitrate by Fisk, of Denver. ⁹_{July 14, '94}

William B. Conway, of Athens, Ga., ²⁰⁷_{Nov., '93} recommends bisulph. of calcium, 1 grain (0.065 gramme) every three hours; also iodoform and creasote. If there be diarrhœa or hæmorrhage he adds tannin, opium, and ergotine.

Fraenkel ⁶⁹_{No. 43, '93}; ⁶⁷³_{Feb., '94} treated fifty-seven patients by subcutaneous injection of typhoid-bacilli cultures. Twelve of the cases were serious, the others moderately severe. The initial dose was 0.5 cubic centimetre ($\frac{7}{8}$ minim), and, on the second and third day, 1 cubic centimetre ($1\frac{3}{4}$ minims). The temperature fell, but rose again, until 2 cubic centimetres (3 minims) were given. The fever was cut short and became remittent, and the patients improved. The typhoid diarrhœic stools disappeared, perspiration and diuresis were copious, and relapses and complications sometimes followed. Cultures of the bacillus pyocyaneus, used in the same manner in thirty cases by Rumpf ⁶⁹_{No. 41, '93} were followed by results claimed to be

equally good. Wilmans³¹⁹_{June 16, '94} says that the number of cases treated by Fraenkel and Rumpf is too small to allow a reliable judgment. He treated eighty cases of the very destitute people of Hamburg by the expectant method and had but one death,—that of a girl who, in a moment of relaxed watchfulness on the part of the attendants, threw herself out of the window.

TYPHUS FEVER.

Bacteriology.—S. Lewaschew⁵⁸⁶_{Nov. 2, 3, '94} examined blood taken from the spleen and from the tip of the finger, and found micrococci in couples or in larger numbers, the single micrococci separating by oscillating movements. Sometimes one of the ends of the microbe terminated by a thin thread; they measured 0.2 or 0.3 μ . Bacteriological study of the blood of one hundred and eighteen patients gave characteristic cultures on agar-agar, in the form of half-transparent cloudlets, along the superficial layer. The contents of the conjunctival sac furnished the same microbes. Lewaschew calls this the “micrococcus exanthematicus” and holds it to be the pathogenic agent of infection. Experiments on animals confirmed his views. Nicolle²⁰³_{Aug. 16, '94} made a bacteriological examination of the pulp of the spleen of a man who had died of typhus, finding no microbe but streptococcus; the same result was obtained in the bacteriological investigations of Brunon and Lerefaît.²⁰³_{Aug., Sept., '94}

Infection.—This disease has created a certain excitement by its sudden spread in France, where, ever since the Crimean War, it was practically unknown to the profession. Especial stress is laid on the necessity of early diagnosis by Proust,¹⁰_{Jan. 2, '94} in order to gain time for therapeutic and prophylactic measures. H. Dubief states⁶⁷_{Dec. 30, '93} that hunger, poverty, and overcrowding do not produce typhus, but prepare the ground favorably for its spread. Prisons, alms-houses, public dormitories, and common ale-houses are the favorite breeding places, and tramps are the most dangerous conveyers of the contagion. They travel slowly, and so have plenty of time to leave the germ in the places where they rest. Direct contact is the commonest way of infection, those who touch a typhus patient being the most exposed. The typhus germ may adhere to the surface of objects and preserve its contagiousness for a long time. The disease seems to be transmissible from the period of

incubation until full convalescence. The seat of the germ is either in the cutaneous lesions (Netter) or in the respiratory organs.

Hubert,²³⁰
June, '94 who studied an epidemic at Amiens, France, in 1893, says that typhus strikes only individuals predisposed by poverty, by vice, and those who have come in immediate contact with typhus patients. In Mexico, however, all social classes are subject to this disease. Hubert believes that typhus patients exhale a characteristic fetid odor. In enteric fever the face shows stupor; in typhus it is of a distinct darkish-yellow tinge; in the former the eruption appears generally on the tenth or eleventh day; in typhus, on the third or fourth day; in Mexico, however, we are accustomed not to expect its appearance before the sixth or seventh day; in enteric fever there is absolute anorexia, diarrhœa, and flatulence; in typhus, constipation is the rule; the nervous symptoms, delirium, etc., are almost identical in both diseases; in enteric fever there are, almost constantly, morning remissions and evening exacerbations, while the temperature in typhus remains equally high morning and evening (39° to 40° C.—102.2° to 104° F.) for several days; in fatal cases of typhus the temperature remains equally high during fifteen to twenty days; in favorable cases there is generally a sudden defervescence about the ninth day. In frank enteric fever the defervescence is progressive and finishes commonly by the end of the third week. The thoracic organs in enteric fever are commonly affected, while pneumonia is exceptional in typhus (not so in Mexico, where it is one of the most common and dreaded complications).

It is necessary to carefully watch the functions of the bladder. Enteric-fever patients frequently have to be catheterized, and the same is true of typhus patients, as they do not know when the bladder is full.

Geographical Distribution.—I wish to call attention to a fact that seems to me remarkable. The high table-land of Mexico is continually scourged by epidemics and endemics of typhus. Orvañanos²¹²² says that typhus is observed everywhere in the country,—in the high lands as well as in low lands, and among many of the central States. He quotes one coast State, Chiapas, where an epidemic reigned years ago. He is in error in speaking in such a general way. It seems that the typhus contagion cannot flourish under an elevation of 3500 to 4000 feet. I have

consulted many intelligent *confrères* practicing on the Atlantic gulf-coast, and they have unanimously declared that during a period of thirty-five years they saw few or no cases of typhus; and researches on the Pacific coast elucidate the same fact. It would be of great interest to know whether in other tropical countries, under similar conditions, typhus fever occurs more frequently or ever becomes epidemic.

Incubation.—The period of incubation is held by Henry Hoel⁵⁷⁷_{Dec., '93} to be from 12 to 13 days. L. D. Pierce Clark,⁸¹⁴_{June, '94} in 40 cases observed at Blackwell's Island, was able to state it approximately in 25 cases. In 3 of them it was less than 9 days; 1 case was exposed but 8 or 10 hours, another only during one meal; another developed the disease 18 days after exposure; 18 of the 40 cases could be traced to three men; 10 had a double exposure,—in the city and at the workhouse; 12 came directly from infected houses in the city. He says that, as the diagnosis of typhus depends almost wholly upon the two symptoms,—temperature and rash,—the former should not under any consideration be modified by antipyretics until the diagnosis is made. As a general rule, as few antipyretics as possible, and preferably cold baths, should be used, and then only when the diagnosis is certain.

Complications.—Knox Bond, of Liverpool,¹⁵_{June, '94} observed five cases of abortion, two fatal, among seven pregnant women sick with typhus. He explains the accident by the extreme degeneration of all the muscular tissue, rapidly induced by the typhus poison. Villecourt¹⁰⁰_{Oct. 10, '93} describes a case of laryngo-pharyngeal phlegmon in the course of typhus, in a man of 45 years of age. Post-mortem examination revealed œdema of the glottis and a large collection of pus on the posterior part of the larynx. Bacteriological study of this pus showed a large number of the staphylococcus aureus. J. Tenner⁸¹⁴_{Aug. 15, '94} gives a history of a case to show that typhus and measles can occur in a patient at the same time, in spite of the wide-spread belief that some infectious diseases exclude each other. A boy of 13 years was attacked with typhus when his older brother was approaching convalescence. At the beginning of the third week he was without fever; a few days later he had a chill, axillary temperature of 40.2° C. (104.4° F.), and ten days later a pronounced eruption of measles. Two younger sisters of the patient were at the same time in the

desquamative stage of measles and he had not had the measles before.

Treatment.—C. Knox Bond¹⁵_{June, '94} says that, the more active the means adopted, the more unfortunate the results. He tries to place the cases under conditions most favorable to recovery: air, ventilation, milk, and beef-tea; eggs and bread in milder cases; cold water *ad libitum*; fish as the tongue moistens after the crisis; meat when the tongue becomes clean in convalescence. He deals with symptoms as they arise, and emphatically proscribes alcohol.

Hoelscher²⁹⁷_{Nos. 45-47, '94} recommends carbonate of guaiacol as an antiseptic for the stomach and intestines, to eliminate poisonous products of intra-organic exchanges; 1 gramme (15½ grains) morning and evening was enough to keep the fever down. The general condition of his patients improved and the diarrhœa stopped after a few days. Guaiacol is not an antipyretic, but combined with antifebrin it acts much better than antipyretics alone. The alimentary canal shows a very marked improvement. Guaiacol carbonate acts favorably on the air-passages. In serious cases the dose was 2 grammes (31 grains) morning and evening. No baths were given.

Lewaschew⁵⁸⁶_{Nos. 35, 38, '93} treated 156 typhus patients, of whom only 3 died; 32 were treated with serum taken from patients in the period of convalescence from typhus,—seven to eighteen days. At first only a few cubic centimetres were injected; later, as much as 233 cubic centimetres (7½ fluidounces). Serum taken from immune individuals has no noticeable effect on the course of the disease.

R. von Jaksch, of Prague,¹¹⁶_{July, '94} has repeated the experiments of Fraenkel and Rumpf, of Hamburg, with cultures of typhus and pyocyaneus bacilli on typhus broth. The products of these bacteria have a certain influence on the course of typhus. In one of the seventeen patients so treated apyrexia was obtained after the fifth injection. In the other cases the effect was not so plain. So far, this treatment is not of any decided advantage. The injections are painful.

Lugo Hidalgo¹⁷⁹_{Dec. 15, '93} gives the following system of antiseptic treatment: Disinfection of the air with a spray of essence of cinnamon; of the room, floor, walls, etc., with a 1 to 1000 solution of corrosive sublimate; mouth-wash of 4-per-cent. boric-acid

solution; two or three enemata daily with permanganate of potash, salol, or salicylate of soda internally. If these are not tolerated, naphthol or salicylate of magnesia; hydrastis Canadensis as an hæmostatic when there is epistaxis, and as a neurotonic; linen to be disinfected with sulphate of copper; quinquina wine, coffee and milk, eggs, broth, roast meat, etc., as nourishment.

H. Dubief⁶⁷_{Nov.30,'03} is not satisfied with the effect of lukewarm or cold baths in typhus; at least, so far as depression of temperature is concerned. Petrusco, of Bucharest,¹⁴_{Apr.11,'04} has systematically employed them in two epidemics, however, with highly satisfactory results. The treatment modifies the cyclical evolution of the fever, saves the patient from the organic weakness of a long disease, and enables him to recover sooner; there is no contra-indication. He prefers the wet pack to both baths and showers.

Combemale¹⁴_{Apr.1,'04} treated 124 cases of typhus fever, 17 cases were subjected to the expectant method, with a mortality of 35 per cent.; 36 patients had two cold baths a day, mortality 33.3 per cent.; those who had six baths a day gave a mortality of 16.5 per cent.; in other cases six enemata a day of 1 litre (quart) of cold water each were given, with a mortality of 28.6 per cent. The more rigidly Brand's method is followed, the more patients will be saved, an uncomplicated evolution and a rapid convalescence being its chief benefits. He has seen fourteen cases of typhus fever in children under 12 years of age, the youngest being 2 years old. The course of the disease was relatively shorter and milder than in adults, no death occurring. Nervous symptoms were reduced to a minimum; but the eruption was abundant and generalized, coming out in successive crops. The temperature ranged about like that of adults, but for a shorter period and with morning remissions.

MALARIA.

Etiology and Bacteriology.—Patrick Manson⁶_{Jan.6,'04} in a clinical lecture on the parasite of malaria and its demonstration, states that in many tropical climates malaria is responsible, directly or indirectly, for half the mortality. Manson belongs to those who, with Laveran, believe the plasmodium malarie to be the characteristic organism of malarial blood. The opposition to this belief is due to faulty technique. Unless certain methods—and very

simple, but necessary, ones they are—are observed in preparing malarial blood, the parasite will never be seen. The slide for the microscope must be prepared so that the blood-corpuscles lie not on their edge, but flat; so that the entire surface and circumference of each individual corpuscle will be clearly visible. The magnifying power required is 500 or 600 diameters. The slip and cover-glass must be very thoroughly cleaned and wiped, and must be quite free from all moisture. A droplet of blood the size of a pin's head is best, the first droplet taken from the finger-tip not being used. The apex of a second droplet is touched with the centre of a cover-glass, and this dropped on a slip. If done successfully the blood will form an exceedingly fine layer, and, after a time, the corpuscles will be found flat, each one more or less isolated. In taking up the blood from the patient's finger the cover-glass should not touch his skin. The lower objective should magnify 300 to 400 diameters, the higher at least 600 or 1000. Searching with the lower power, one will perceive sooner or later, either in a blood-corpuscle or in the plasma of the blood, a minute speck, black or very dark brown. Turning on the higher power, it will be found that the black pigment is inside a clear, transparent, homogeneous substance which, in its turn, may be either inside a blood-cell in an irregular shape or free in the plasma. In another form this pigment is heaped up at the centre of a pale, circular disc or long, sausage-shaped rod, which may be either straight or more or less bent into the form of a sickle or crescent. The pigment is diffused through a clear body as granules, stationary or in active movement, and inside a sphere much smaller or quite as large as a blood-corpuscle. These are the principal forms. All are but phases of one polymorphic organism.

H. Rosin ¹³_{May 15, '94} subjected living malarial parasites, under the microscope, to the action of a solution of quinine 1 to 5000, and of a solution of methylene-blue 1 to 20,000. The former did not at all affect the movement of the plasmodia, not even after ten hours; the latter destroyed it very soon, and in about half an hour the microbes were stained a beautiful blue. Claudio Sforza, ⁵³¹_{Nov. '93} from experiments with a certain method of staining by eosin and methylene-blue, is led to consider the crescents as degenerations of certain parasites which, during the whole cycle of their development, have only partly invaded the red blood-corpuscles, the

largest part of the semilunar body being nothing but the same red blood-corpuscles on the road to destruction.

Camillo Golgi,¹¹⁰²_{Nov., Dec., '93} in a letter to Baccelli, treats of the etiology of a group of malarial fevers which occur in summer and autumn, in regions where severe malaria prevails. Marchiafava and Celli,⁵⁰_{Sept. 6, '94} as the cause of these fevers, describe a special variety of parasite which makes its evolution in the blood in form of small, not at all or scarcely pigmented intra-globular amœbæ. They distinguished two varieties of these parasites some of which develop in one day and others in two days, corresponding to summer quotidian and summer tertian fever type. They call the latter "malignant tertian" in order to distinguish it from the common tertian, the parasites of which have been discovered and described by Golgi. Careful and systematical inquiries by the latter lead to a different conclusion. According to him, the evolution of the parasite takes place not in the circulating blood, but in the internal organs (spleen and marrow of the bones), and only by accident reaches the blood, where its presence is not a necessary sign of this group of malarial fevers. In these fevers there is no constant relation between the clinical manifestations and the hæmatological condition, for in cases of severe infection only a few amœboid forms may be found in the blood, and *vice versâ*. The cycle of evolution of this parasite is not yet completely known, but Golgi is able to describe three phases: 1. Small, unpigmented, or very small pigmented amœbæ. 2. Small amœbæ with central accumulation of pigment; greater or less invasion of the red blood-corpuscles; complete or almost complete destruction of hæmoglobin. 3. Endoglobular or free parasites; sporulation in manifold and irregular ways.

Golgi believes that these parasites undergo evolution within the cells (leucocytes or tissue-cells), and that therefore they possess greater resistance to the action of quinine. He proposes to divide malarial fevers into 2 classes: 1. Those in which the parasites are essentially connected with the circulating blood. Of these there are different varieties: (*a*) Fevers due to a parasite the evolution of which requires three days (quartan). According as the infection is represented by one, two, or three generations of the parasite, we have quartan simplex, duplex, and triplex and certain irregular fevers. (*b*) Fevers due to a parasite the evolution of which is

accomplished in two days. If there is in the blood one or two generations of the parasite that ripens within an interval of one day, we have simple tertian or duplex tertian, another category of quotidian and other irregular fevers. 2. Fevers the pathogenesis of which is connected with parasites having their seat principally in the internal organs, where their cycle is evolved. These fevers offer manifold and irregular types. To this class belong the fevers connected with the sickle-form bodies. In group 1 microscopical examination of the blood in every stage of the clinical course gives a positive result, but this is not so in the second class. Bastianelli and Bignami, of Rome, ⁵⁰_{Sept. 6, '94} also studied the parasites of summer and autumn fevers in living blood and fluid from the spleen.

J. S. Rawlins, ⁷⁴_{Aug., '94} Khan Bahadur, ¹⁰⁵⁵_{Feb. 1, '94} E. Steudel, ⁴¹_{Apr. 28, '94} Ch. Forbes, ²³⁹_{Mar. 1, '94} Geo. Dock, ⁵_{Apr., '94} and Joao Vincente Torres Homem ²⁰²_{July 25, '94} publish papers from which it appears that no methodical classification of the various forms of pernicious fever is possible. It is not rare to observe a paroxysm of pernicious fever in a patient with malarial cachexia, whether at the height of the latter disease or at the period of perceptible improvement. The most pernicious form is the hæmorrhagic. The disease is characterized by rapid evolution of the morbid phenomena, which go on to a fatal termination or retrograde with the same rapidity and are replaced in a few days by convalescence. E. Steudel, ⁶⁹_{Aug. 30, '94}; ¹³³_{June 11} during a two and a half years' stay at Bagamoyo, German Eastern Africa, treated eighteen cases of the most pernicious form of malaria, called "black-water" fever on account of its most striking symptom,—the dark-colored urine. He believes it to be the acute and most intense form of latent malaria. Sixteen of the patients were Europeans. Those who returned to the swampy coast after expeditions to the interior were the most exposed when they had passed one-half or one year in the country. The most important phenomenon is an enormous diminution of hæmoglobin in the blood, which falls to 25 per cent. of the normal. The time of incubation (latent infection) is between a few days and several months. "Black-water" fever begins with a heavy chill; the following stage of heat is between 41° and 42° C. (105.8° and 107.6° F.). Bilious vomiting sets in in paroxysms after the first chill, with swelling of spleen, diarrhœa, icterus, and dark-brown, bloody urine, in which the microscope exhibits cylinders and

epithelia. The prognosis is bad as long as the patient lives in the tropics, as the disposition to new attacks increases with every access. Jellison²³⁵_{Mar., '94} reports from Nanking a case of pernicious fever in a man, in which there were combined algid, comatose, and convulsive symptoms, with a complete absence of surface-heat in the comatose stage.

Blood.—Giacinto Viola⁴⁶⁸_{Mar., '94} made researches into the density and resistance of malarial blood, finding that the density diminishes as soon as the temperature begins to rise, even before the chill appears, the density being least during the chill; when there are profuse sweats during effervescence there may be a slight increase of density. In tertian fevers, in which the apyrexia of the following day is disturbed by a slight rise in temperature, there is, at the critical hour, a slight decrease of density. During apyrexia, after an attack, the density constantly increases. In cases of recent infection, with long intervals between intense attacks in a strong organism, there is an increase of resistency during the course of the infection.

Urine.—Colasanti and Jacoangeli⁵⁸⁹_{Jan. 5, '94} have come to the following conclusions as to the elimination of iron by the urine in malaria: Normal urine always contains iron; during fever the amount is greater than during apyrexia, in proportion to the temperature and duration of the fever; malarial urine contains more iron than that of other feverish diseases, elimination being more noticeable after the access. In primary malarial infection the elimination of iron is in inverse ratio to the quantity of Hb of the blood. G. Reni-Picci and G. Bernasconi⁹⁹⁶_{June 10, '94} find that there is often, in malarial infection, an increase in the elimination of phosphoric acid during the first twenty-four hours. This they attribute to the increased ingestion of food, which is so commonly desired at the onset of the illness. Almost as soon as the temperature has risen distinctly above the normal, there is a very notable diminution in the amount of phosphoric acid eliminated, in spite of the fact that the amount of urine passed is generally much increased. This diminution is independent of the amount of food taken, and occurs even if at the beginning of the access a large dose of phosphate of sodium is taken, or if the same drug is given by subcutaneous injection. The diminution is not proportional to the degree or duration of the fever. Immediately after the access of

fever ceases there is a remarkable "unloading" of phosphoric acid, which continues for several hours and generally compensates for the retention observed during the febrile paroxysm. If the access is cut short by quinine, phosphaturia is usually observed. In chronic malarial cachexia the elimination of phosphoric acid did not appear to be affected.

Diagnosis.—F. A. Riquez, of Caracas, Venezuela, ¹_{Sept. 23, '93} states that there is but one unquestionable means of diagnosis, and that is the microscopical examination of the blood. All malarial manifestations are accompanied by melanæmia, which presents itself exclusively in malarial diseases; the sign is therefore pathognomonic, and every suspected case should be examined. A drop of malarial blood shows the masses of black pigment in the plasma. The manipulation requires no special technique as far as the black pigment is concerned. The number and sizes of the pigment-masses are proportional to the degree of malarial poisoning. Whenever they are found the indications are for quinine. Where pigment is seen in other diseases it is only an evidence of malarial complications. In epidemics of yellow fever and typhus he had never found even a trace of pigment, while in some isolated cases of yellow fever he had found pigment, pointing to a hybrid disease. The addition of sulphuric acid will settle the question. If the pigment is not dissolved by it the case is malarial.

Hervouet ¹²⁷_{May 12, '94} indorses the view of Celli, that malarial diseases may exist at one time in a certain place and afterward disappear. To disregard this fact is a fruitful source of mistakes in diagnosis.

A case of paludal gastrodynia, of serious aspect, is published by Julio M. Muñoz Bustamante. ⁷⁷³_{June 5, '94} It appeared in two attacks and was cured by quinine. This form of neuralgia is quite rare. Mortimer Hoeven ⁹⁹⁶_{July 10, '94} sustains that, after an epidemic of intermittent fever, infectious germs, though attenuated, remain active for a long time in a population and show their presence in a great number of forms.

Treatment.—Pucci, of Rocca Bernarda, ⁵⁰⁵_{Dec. 7, '93}; ⁶⁷³_{May, '94} treated twenty patients with hydrochlorate of phenocoll, giving $\frac{1}{2}$ to 1 gramme ($7\frac{3}{4}$ to $15\frac{1}{2}$ grains) daily in doses of 0.15 to 0.25 gramme ($2\frac{1}{4}$ to 4 grains) between the intervals of the attacks. The remedy

was continued for five or six days, combined with quinine, arsenic, or iron. Of the twenty cases, cure resulted in seventeen. The medicine should be given fasting, the last dose being taken four or five hours before an expected attack. It was well tolerated and caused no digestive disturbances. It acts as a stimulant of the red corpuscles and combats the effects of the hæmatozoön. Hydrochlorate of phenocoll, according to him, appears to be a succedaneum of quinine, sometimes succeeding where the latter remedy is not tolerated. It may be successfully employed even in abnormal and complicated forms of malaria. Twenty-eight cases were treated with phenocoll by Cerna,⁸⁰_{Dec.15,'93} 21 successfully. In 7 cases the drug failed, though the temperature was reduced; 3 of these yielded to quinine; the other 4, in which quinine also failed, finally yielded to arsenic. Phenocoll was very well borne by the patients. The dose for adults is 1, 2, or even 3 grammes (15½, 31, or 46 grains) a day for four or more consecutive days. No disagreeable after-effects were observed. The drug is also recommended by Cicognani⁸²⁶_{Dec.,'93} and Casati.³⁵⁹_{Aug.26,'94} Feletti⁵⁸⁹_{Apr.11,'94} tried it in several cases, but found that it had only a transitory effect.

Quinine continues to be largely used, and among those recommending it are Bing,⁶⁹_{Feb.18,'94} Risquez,¹_{Sept.23,'93} and R. G. Sayle.¹⁹_{Feb.,'94} Valenti⁵⁹⁶_{July,'94} publishes a case in which, as in Tomaselli's cases, the use of quinine or other cinchona preparations in malarial patients was followed by a paroxysm, characterized by tremor, rigor, paleness, cold sweat, lumbar pain, bilious vomiting, and general prostration, followed in the second stage, after one to three hours, by considerable rise of temperature, frequent pulse, dyspnoea, sero-bilious diarrhoea, hæmaturia, and icterus.

Opium is recommended as a preventive and curative by F. P. Maynard,²_{Feb.24,'94} and Hamilton,²_{Jan.13,'94} from experiments with opium-eaters and opium-smokers in India, and by Charles Forbes,⁶_{Jan.27,'94} who likewise praises the essential oil of *Eucalyptus globulus* as the most powerful and least harmful of bactericides. Charles Forbes,²²_{July 4,'94} among other remedies, recommends Warburg's tincture, which is without equal in persistent and protracted agues and in some of the worst forms of fever, and hazeline (distilled from the twigs of witch-hazel); if these fail, citrate of ergotine 1 to 100, subcutaneously, may have specific action.

Clemente Ferreira, of Brazil,⁶⁷_{Nov.30,'93} recommends methylene-blue

in the malaria of children; Dabrowsky, of Warsaw, ²⁶_{May 1, '94} is enthusiastic in its praise, as is M. Schnabel. ¹⁴⁷_{Oct., '93} Fratnich ¹¹⁶_{Apr., '94} used it in four cases, with good results. The strangury occasioned by its use was prevented by small doses of nutmeg-powder.

An infusion of six fresh leaves of *Syringa vulgaris* (lilac) to a cupful of hot water is highly recommended by Mesiatzeff. ²_{Feb. 3, '94} Two cupfuls daily are to be taken until cessation of paroxysms, and one cupful for two or three days after. P. F. Filatoff, ⁵³⁰_{Nov. 15, '93} in a paper on the treatment of malaria by sunflower,—a popular Russian method first introduced by him into scientific medicine in 1879,—once more warmly recommends it. The best preparation is a tincture, 1 part of dried sunflower-stems to 8 parts of brandy, digested for a week; dose, 1 tablespoonful three times a day for an adult. Many Russian physicians have tried it with very good results.

Intermittent, Remittent, Slow Fevers, etc.—Long-continued fever; typho-malarial, remittent, long-continued fevers that resist quinine; hæmatinia, swamp fever, slow fever, prolonged remittent fever, hæmatinuria, gastric intermittent fever, malarial poisoning, malarial cachexia, chronic intermittent fevers—all these different names mean something which resembles intermittent fever, but which is not malarial, as quinine has no effect on it; which resembles typhoid, and yet is not typical enteric fever. Theoretically the question is easily settled. If, before beginning the treatment, we should examine the blood and find Laveran's plasmodium malariae, it is malarial fever; and if we find Eberth's bacillus, the case should be declared one of typhoid. Practically, however, this is not possible; the malarial element combined with other affections so modifies them that a strict diagnosis is most difficult. We have seen, in the city of Mexico, several such cases in typhus patients, in which the evening temperature was nearly normal, and yet ran up as high as 39.5° C. (103° F.) in the mornings.

These fevers are considered as typhoids by Bowling ⁸²_{Oct. 21, '93}; Flint, of New York; West, of Galveston; Wilson and Eshner (ANNUAL, 1892). The fact that no source of infection can be traced does not prove that it is not typhoid. In some cases typhoid lesions have been found, though the patients presented no symptoms of enteric fever. G. G. Buford, of Memphis, Tenn., ⁷⁴_{Oct., '93}

reviews the various names given to this disease, and concludes that hæmatinia, or swamp fever, should be called hæmatinuria, since hæmatin in the urine is a prominent symptom.

E. L. Patterson ⁴³_{Aug., '94} relates that, at the March, 1892, meeting of the Barnwell County Medical Association, half of the physicians of the county, by request, reported 452 cases of continued fevers, 222 being classified as typhoid, the remaining 230 cases as continued, etc. The remaining half of the physicians did not report, as they did not regard these fevers as typhoid. L. C. Stephenson did not consider them as of malarial origin, as the quinine treatment utterly failed to abort or to control them. Robert I. Draughon, ⁸¹⁴_{Aug. 15, '94} in discussing the "congestive malarial fever of the Southern States," says that the onset of the fever is sometimes very sudden, the subject being stricken down without premonition, as in the pernicious form, but that generally it makes its approach more gradually.

Eldridge G. Cutler ⁹⁹_{Sept. 6, '94} reports a case of remittent fever, followed by death, in a man, 25 years old, who had, one year before, spent four months at New Orleans, where he probably caught the disease. His last illness began as "tertian chills and fever" five months before admission; he was ill continually afterward. During the last week he had had no chill, but constant high fever. Autopsy two hours after death showed the spleen to be enlarged, weighing $3\frac{1}{4}$ pounds ($1\frac{1}{2}$ kilogrammes), 22 centimetres long, 12 broad, and 5 thick. Crescents, granular in the centre, were found in the blood on the second or third day at the hospital. These were examined by Councilman, who stated them to be perfectly characteristic. They were first seen and described by Virchow in 1854, and considered by him to be endothelial cells from the spleen containing pigment. The process of segmentation of the plasmodium takes place during the chill; we may find at this time, in the blood, masses of free pigment, which have come from the breaking up of the organisms and are taken up by the white corpuseles. As the pigment remains in the organs for a very long time after recovery from the disease, Councilman was much surprised at the absence of pigment in the spleen.

According to W. B. Crawford ¹⁰⁶³_{Mar., '94} and F. L. Sim, ⁷⁴_{Feb., '94} the nervous system is much more involved in typhoid than in typho-malarial fever, in which there is never any eruption, bronchial

hyperæmia, or cough; the mortality of typho-malarial fever is almost *nil*; there is no sensitiveness in the lower abdomen or in the right iliac fossa, no gurgling on pressure, no tympanites nor "pea-soup" stools, no intestinal hæmorrhage, and no ulceration of Peyer's patches. Typhoid cannot be cured in two weeks, as can typho-malarial fever.

Prolonged remittent fever at Caracas is considered by David Lobo,⁵⁴⁶_{Mar., '94} who states that typical cases of intermittent fever are rarely met with at that place. The remittent fever shows a temperature range of from 38.5° to 40.5° C. (101.4° to 104.8° F.), dropping or rising unexpectedly; remission may occur at any moment of the day; chills or sweating mark no definite stages of the fever. The tongue is smooth, clean, and moist; bowels generally regular; spleen seldom enlarged; delirium never present; and there is no impairment of sensibility or motility. The fever generally runs its course free from complications, defervescence occurring gradually or by crisis, the average duration of the attack being thirty-five days. A fatal issue is seldom to be feared where no complications occur. This fever is very slowly influenced by quinine. Warburg's tincture is a valuable remedy. Cool baths and lotions must not be spared, as they lower the temperature.

Julius Dreschfeld⁹⁰_{Apr., '94} publishes six cases of "idiopathic intermittent fever of pyæmic character." Four of the six cases were fatal; all were men without alcoholic symptoms with but one exception; none had lived in tropical or malarial climates; none had had malaria or rheumatism, and none had suffered injury. The pyrexial attack was followed by an afebrile period. Enlargement of the liver came later on, and jaundice still later. The spleen increased in size with the progress of the disease. Quinine, arsenic, and methylene-blue had no effect; nor was there any periodicity of the attacks of pyrexia. These cases, after all, were not intermittent fevers, and must be looked upon as pyæmic on account of the suppurative hepatitis in two fatal cases, the relation of the disease to pyelophlebitis and ulcerative endocarditis, and the presence of numerous micro-organisms in the liver in one case. As to the micro-organisms no pure cultivations were obtained, as the liver was not fresh enough when it reached the pathological laboratory.

Spiridion Kanellis, of Athens, ⁶⁷_{Apr. 15, '94} ⁸⁰_{July} recommends the following line of treatment in cases of chronic intermittent fever. The patient is advised to take, every morning, four pills of the following combination: Sulphate of quinine, 11.25 grammes ($2\frac{3}{4}$ drachms); arsenate of sodium, 0.03 gramme ($\frac{1}{2}$ grain); extract of cinchona, q. s. Mix and make thirty pills. The four pills are to be taken for two weeks without interruption; they are then stopped for a week, to be resumed for a second period of two weeks, and so on during a course of three months. At the same time the patient must take twice a day, at noon and at night, and without interruption during the three months of treatment, before meals, a cupful of this mixture: Bark of royal cinchona, 0.30 gramme ($4\frac{1}{2}$ grains); absinthe-herb, 0.30 gramme ($4\frac{1}{2}$ grains). For an infusion, the quantity of which should be 700 grammes ($22\frac{1}{2}$ ounces), dry extract of cinchona, 3.75 grammes (58 grains); cognac, 60 grammes (2 ounces). In the morning, two hours before taking the pills, patient is to take a glassful of milk. At noon the meal should consist of strong bouillon, beefsteak, eggs, and old wine; the same *régime* at night, the patient to get to bed as soon after this last repast as possible. The author affirms that he has treated five hundred and twenty patients by this method in the course of ten years, with most excellent results. Peña and Sariol, of Córdoba, Mexico, treat remittent fever with subcutaneous injections of artificial serum, combined with the internal use of quinine, with good effect.

VARIOLA.

Infection and Incubation.—Schrevens, ⁵²_{v. 8, No. 1} in an exceptionally careful study of seventy-nine cases at Tournai, Belgium, has established the period of incubation to be fourteen days, though he admits that this period, under given conditions, may vary. The sanitary service of Denmark ²¹²³_{p. 813, '91} gives nine to ten days as the time of incubation for variola and varioloid. Schrevens was able to trace the seventy-nine cases back to four original cases, every one of which was imported from outside of Tournai. In twelve cases the germ came from outside the house of the patient, either in a direct or indirect manner, by customers in shops, by rags, by a fellow-workman, or by a member of the family. Two school-children observed a man lying in the street with fully-developed

variola ; they stopped to look at him, but did not get nearer than eight metres, yet they caught the disease. Country-people preserve the contagion much longer, because they are refractory to bathing and other measures of hygiene. The slightest cases of variola, the most insignificant varioloids, often give rise to most terrible contagion, because they do not inspire enough suspicion.

The question of the identity or duality of the virus of variola and of that of vaccinia has often been debated. Interesting and valuable studies have lately been made, but the question is not yet definitely settled. Talamon ³¹_{Feb. 14, '94} expresses himself in favor of the view of identity, Cöttinger against. Dupuy ³¹_{Feb. 14, '94} has repeated the experiments of Fischer, Eternod, Voigt, Haccius, and Hyme, who inoculated variola into heifers and claimed to have obtained, after four or five generations, a product having all the qualities of vaccinia, but in which the variola poison has been attenuated by passing through another species of animals. He therefore claims that vaccinia is nothing but variola, producing, when inoculated on man, a localized vaccine. Chauveau objects that these experiments were not made with all the necessary precautions, and without the certainty that vaccinia was inoculated. Juhel-Renoy also comes to the conclusion that variola and vaccinia are two species. P. A. Lop, of Marseilles, ¹⁰⁰_{Jan. 27, '94} on the ground of certain experiments and of one hundred and eighty observations of his own, pronounces himself in favor of the identity of the two. Wm. Hardman ²_{Jan. 29, '94} asks whether cow-pox did not originate from a case of real human small-pox at some anterior period. Tison is another ²¹_{Mar. 4, '94} champion of non-identity because, as he says, vaccinia never reproduces variola, as it would certainly occasionally do if the two were identical. He says that the variola vaccine in use in Germany and Switzerland cannot be anything but variola virus, attenuated, but full of danger. As to variolization, it is a repulsive proceeding, still extensively practiced in Central Africa. Hervieux ¹⁴_{Feb. 18, '94} is a partisan of the non-identity theory.

Delthil ¹¹_{Feb. 25, '94} saw a woman being confined when she had a full eruption of variola. The child was successfully vaccinated. The mother died, having nursed the child up to her death, with pustules even on the nipples. From thirty-seven years' observation at the Stephanie Hospital for Children at Budapest, Geza Békésy ¹³_{May 16, '94} states that varicella and variola are not identical, since

the two diseases present themselves, within the first seven years of life, independently and in equal numbers; varicella attacks vaccinated and unvaccinated persons, while variola is comparatively rare in the vaccinated.

Bacteriology.—Stephen C. Martin ⁹⁹_{Dec. 14, '93} examined the lymph of cow-pox and found that none of the many varieties of vaccinia ever produced cow-pox when inoculated upon the animal. He confined himself to hardened, sterilized serum of bullocks' blood as a culture-medium. These cultures contained quite a variety of bacteria. In every instance the blood-serum was liquefied until he obtained a culture which, after nine generations, was inoculated and in every instance produced a perfect vesicle of cow-pox. From the vesicles produced by it upon the calf he vaccinated a number of children, in every case inducing vaccinia of the most perfect type. The bacterium varies in form according to the various conditions of its nutritive environment and the consequent rate of development. The most constant form is a short, fine bacillus with rounded or nearly square ends. Where the nutrient medium is fresh it divides rapidly and forms short bacilli and often a pure micrococccous form, frequently forming chains. The growth stains well with Ziehl's carbolic-acid fuchsin solution. Martin believes that his tubes contain but one single species, assuming different forms according to the various conditions of nutrition, the typical stage being a coccus, which becomes a rod and then a "balloon," the latter being either a spore (Dauerform) or a degeneration form. He concludes that the germ of cow-pox is a bacterium which can be grown upon certain kinds of blood-serums, and that, after an infinite number of generations, it retains unimpaired its pathogenic properties. Jackson Clarke, ²²_{July 25, '94} in many examples of fresh vaccine-lymph examined under the microscope, found granular or reticular, highly-refracting bodies, with a small, round, nuclear body surrounded by a narrow, clear space, the appearance of which in stained sections is identical with bodies which the author has described as parasites in psorospermiosis of the urinary tract, in cancers, and in sarcomata.

Guarnieri, of Pisa, ⁵⁰_{Aug. 25, '94} says that the alterations before pustulation and the pustules themselves are due to a parasitic microbe which he calls *Cytoryetes vaccinae resp. variolae*. This organism has amœboid movements, observed in the hanging drop on warm

cover-glasses or in the contents of the original vesicle. He saw the multiplication of the parasite under the microscope and phagocytosis by multinuclear leucocytes. A mixture of methylene-blue with blood-serum with the drop taken from the vesicle showed him the structure of cytoryctes, which possesses an easily-stained spherical body with a clear halo. This halo is not inclosed in a membrane, but is surrounded by concentric, highly-refractive granules. He feels sure that the stainable body is a chromatic nuclear substance, the balance of the corpuscle being protoplasm. He has discovered similar corpuscles in vaccine-lymph and in cultures of it on the cornea of rabbits. In these corpuscles he found a double-staining substance. No other source of irritation produces in the cornea anything like the appearance of that parasite. He believes that the cytoryctes is a zoöparasite belonging to the rhizopoda class, and that it is the cause of both cow-pox and small-pox. Monti, of Pavia, ⁵⁰_{Aug. 25, '94} in ten patients, found, in a large number of variola pustules, constantly staphylococcus pyogenes aureus and a microphyte of the normal epidermis. In the epithelial cells of the median layer of epidermis he found characteristic corpuscles, easily staining with hæmatoxylin and with a mixture of hæmatoxylin and safranin. These corpuscles are of various forms,—sometimes exceedingly small, at other times 2 to 3 μ , each inclosed in a special cell. In the contents of developed variola pustules similar corpuscles are found. Inoculation on the cornea of rabbits produced small, transparent nodules in which, on the second or third day, the same corpuscles were observed as in the skin of variola patients, which makes him believe that these corpuscles are the real parasites of variola. They were met with not only in the skin, but often in the pharynx and larynx; sometimes in the lungs, testicles, and spinal marrow. He observed amœboid movements in these corpuscles. Armand Ruffer and H. G. Plimmer ²_{June 30, '94} examined a large number of vaccinia pustules in the cow, in the monkey, and in three cases of severe variola, and always found the cell-inclosures described by Guarnieri. These corpuscles differed essentially in their staining-reaction and in their appearance from those described by Pfeiffer, Van der Loeff, and others.

Diagnosis.—It is a well-known fact, and every new epidemic makes it more evident, that the diagnosis of variola, particularly

in the beginning, is occasionally very difficult. In Warren White himself ⁴³_{Feb., '94} two medical men diagnosed scarlet fever, as there was at first nothing but erythema on hands and face, chest and abdomen, and as a long time had elapsed since he had visited a small-pox ward, which was only for a quarter of an hour (but while hungry and tired). Variola and varicella sometimes resemble each other so closely that only the most skilled observer is competent to distinguish the two diseases. According to T. B. Brook, ⁶_{Jan. 20, '94} in the ill-nourished, insufficiently-clothed children of the poor the eruption of varicella is often not typical; the papules never become vesicular, but die off before that stage is reached. Small-pox in young vaccinated children under 6 years of age is very unusual. He mentions a female of 30 years who had a scanty papular eruption on the face, each papule surrounded by a slightly-reddened areola and with a somewhat hardened base. There was a history of severe prodromal symptoms. A few typical vesicles of varicella were found. This patient was vaccinated and the vaccination had been successful. J. E. Barnett ⁶_{Jan. 20, '94} has found that the eruption of vaccinia may complicate the diagnosis. Many persons of certain age contract chicken-pox, and in these cases the severity increases *pari passu* with the years, as is the case in other usually infantile ailments.

S. G. Webber ⁹⁹_{May 10, '94} had to treat four cases of variola from the same house, all having been exposed to the disease by taking care of a friend who died. Case 1, a man aged 22, was taken ill on October 23d and entered hospital on the 27th. He passed blood and had considerable dyspnoea at times. The whole body was livid, the pulse imperceptible. Death occurred in the morning. This case is remarkable from its rapid course, sudden termination, and absence of eruption. It would have been impossible to determine the nature of the disease if the case had been solitary. Case 2, a young man, was one of mild, discrete variola. Case 3, very severe, recovered. Case 4, with high fever, recovered. Another of Webber's patients pursued a regular course until the thirteenth day, when the pustules formed large blisters filled with thin, pale-colored serum. Delirium set in and the man died on the sixteenth day, from pyæmia. He had been vaccinated from five to seven days after exposure. Webber says that as long as the temperature is low there is no danger and no complication is

likely to arise, except hæmorrhage, which gives unmistakable notice of its presence.

Complications.—S. W. S. Toms⁹_{Feb. 24, '94} observed a case of tetanus complicating vaccinia. Gangrene set in at the point of vaccination, about eighteen days after vaccination. Under appropriate treatment the arm got better. The child took cold, fever came on, the tongue had a dark-gray coating, aphthous patches appeared in the mouth, then came tetanus and death. This case is quite a rare one. J. S. Billings, consulted in regard to it, replied that he was only able to find six cases of tetanus following vaccination, by an examination of the United States Army Medical Library. Cultures made from some of the pus and part of the tissue, taken at time of death from the vaccination ulcer on the arm, proved negative, and so likewise did cultures made from the point used for inoculation.

During the months of December, 1893, and January, 1894, in the State of Ohio, ⁷⁸⁶_{Apr., '94} severe local disturbances were observed after vaccination, viz., intense inflammation of the cellular tissue surrounding the place of inoculation, high fever, vomiting, muscular pains, headache, œdema of the arm, and in one case even delirium. In several instances a papulo-pustular eruption over the whole body, with molecular death at the point of inoculation, was observed, leaving an angry-looking, deep excavation behind. In the case of a child of 7 years a typical acute nephritis developed four days after inoculation and lasted two weeks, resulting in complete recovery. A 12-year-old boy, two days after vaccination, cut the index finger of the right hand, inflicting a small incised wound. No pustules were found at the point of vaccination, but the cut on the finger reacted violently. Recovery ensued.

Thomas U. Raymond, ¹¹²_{May, '94} induced by a report of two cases of purpura complicating vaccination, publishes a case of his own in a recruit. B. Auché²⁵_{May, '94} records seventeen minutely-observed cases of broncho-pneumonia in variola. This complication is not so rare, comprising 37 per cent. of post-mortem cases. The forms observed were splenization and red and gray hepatization. This complication was found in all serious forms of variola, during the stage of suppuration (once in a case of variola hæmorrhagica on the third day of the eruption). The affection is always bilateral, but more developed on the right side. Various species of microbes

were found, either isolated or combined, viz., Talamon-Fraenkel's pneumococcus lanceolatus, streptococcus pyogenes, and staphylococci. These microbes are the agents of secondary infection, coming either from the cavity of the mouth, from the pustules of the air-passages, from outside or from another patient, conveyed by the air.

A. T. Sloan ³⁶_{Jan., '94} had three patients with complications after recovery from small-pox. The first was a girl of 3 years. When seen the face and head were completely covered with a hard, papular rash, in some places vesicular and sero-purulent, and on the forehead distinctly confluent. The idea of chicken-pox was dismissed, for the character and distribution of the rash were conclusive. It was pretty well distributed over the arms, especially on the flexor surfaces. There were no vaccination marks visible, though the child had been vaccinated. The patient showed very well the after-appearance of a mild attack of small-pox. In the second case premature labor came on when seven months pregnant, the distinctive papular rash of small-pox being seen on the face, head, arms, and abdomen. The woman gave birth to a female child, which exhibited no rash and died in a few hours. The mother made an uninterrupted recovery. Two good vaccination marks were visible. The third patient's illness commenced with a severe attack of herpes zoster, with intense pain. A further eruption made its appearance on the chest and abdomen, here and there petechiæ, with a general measles-like mottling. The next day the typical eruption of small-pox was present on the forehead, face, and scalp, with a few papules on the arms and trunk. The herpes did not seem to be a mere accident, as the patient had been infected with small-pox at least twelve days before, and a simultaneous appearance of the herpes with the preliminary rashes seemed to be a complication never previously observed.

Pokrowski ²¹_{June 30, '94} saw a girl of 10 years with a variolous eruption on the whole body; on the third day measles made their appearance, covering almost the entire body, with syndesmitis and bronchitis. This lasted two days; then came a new outbreak of papules, some of which only formed pustules. He thinks that the measles infection attenuated the variola. Gordon Simmons ¹⁴⁴_{May, '94} relates the case of a woman with a fever-blister on the right angle of the mouth on which a variola pustule developed. A week

before she had several times dressed the arm of a man who had been recently vaccinated. The local and general symptoms were severe. Davezac and Delmas ⁵_{July, '94} report the case of a woman, 33 years old, never vaccinated, who developed an attack of the confluent form. During convalescence she was seized with a convulsion and unconsciousness. When consciousness returned it was observed that the left arm and leg were paralyzed. Purulent pleuritic effusion took place; thoracentesis was performed. At the end of a week she suddenly had four epileptic attacks in rapid succession and died. Post-mortem the cortical structure of the right hemisphere over the summit and adjacent portion of the posterior half of the ascending parietal convolution came away with the membranes. This area was softened and brownish red. It is believed that at the first convulsion the third branch of the left Sylvian artery was occluded by an infective embolus, the presence of which caused encephalitis, with softening.

S. T. Hubbard ¹_{Mar. 17, '94} refers to the case of a patient with small-pox who entered hospital; fourteen days later another patient came from the same house in the town with measles. J. Chéryu reports ⁵⁷⁷_{May, '94} three cases of variola, varioloid, and petechial varioloid combined.

Brunon and Lerefaît, ²⁰³_{Sept. 16, '94} under the heading "Hybridity of Diseases," relate three cases of abnormal variola, apyretic; rash; death. Comte ²⁴³_{Oct., '93} reports cases of inoculable eruption after vaccination from the teat to the arm: 263 young soldiers were vaccinated, the pustules developing moderately, and 4 cases of good vaccination developing only on the fourteenth day. The post-vaccinal eruption appeared alone or with a legitimate vaccinal pustule, which was red and of different forms, being sometimes large papules, and appearing generally about the tenth day. In 3 successfully vaccinated men a bright-red eruption was observed twice. In 56 successfully vaccinated men a red eruption was noted twenty-eight times; in 179 men, revaccinated without success, the eruption was observed one hundred and forty times. This eruption was quite harmless, and its inoculation was in several cases successful; it appeared on the tenth day and lasted seven to nine days, and could be produced again by new inoculation. It was of a papulous kind and contained a bloody or serous liquid. The papules disappeared by drying and exfoliation. It did not confer

immunity against vaccination. In the lymph were found staphylococcus pyogenes aureus and cereus albus.

Petter, of Berlin, ²²_{Feb.14,'94} showed a boy, aged 6 years, suffering from chronic eczema. His whole body was covered with pustules from the size of a pea to that of a flaxseed. On account of the eczema he had not been vaccinated. A fortnight before the outbreak of the disease a sister had been vaccinated with calf-lymph. As the pustules formed, both children had been bathed in the same water. The boy had in this way been inoculated with humanized lymph. Morel-Lavallée ¹⁰⁰_{Aug.30,'94} successfully vaccinated four persons with fresh vaccine-lymph. In one of them the pustules dried up, but about the seventeenth day ulcers developed on the side of the pustules resembling exactly ecthymatous syphilitic chancres.

Inherited Immunity.—Auché and Delmas ²⁵_{May,'94} state that variola in the mother before pregnancy sometimes produces immunity of the infant. Variola in the mother during pregnancy renders the child amenable to vaccine-virus for five or six days; it may be born with variola or pox-marks (refractory to vaccination), or it has not and will not have small-pox. If born during incubation, invasion, eruption, and even suppuration of the mother's variola, the child may be successfully vaccinated. If born during desiccation and convalescence of the mother, it is often amenable to vaccine-virus. Later on immunity develops and lasts for a few months or even two or three years.

According to A. Lop, ¹⁰⁰_{Jan.27,'94} congenital variola is rare; variola of the mother gives the fœtus either variola or makes it refractory to variola and vaccinia. This immunity lasts as long as that conferred by vaccination. Miscarriage in cases of variola is due to maternal toxæmia. Casey ²_{Feb.3,'94} describes the case of a woman who gave birth to a child, she being seven or eight days gone in the incubation stage of small-pox. The child showed no eruption until seven days after birth, having probably taken the disease from an elder sister, and not having been infected *in utero* nor by the mother's milk. The child was vaccinated five days after the infection and developed five fully-formed vaccine-vesicles and a copious attack of small-pox, hardly modified. Casey saw five other examples of a precisely similar sequence, all vaccinated, probably five days after infection. In two the cow-pox took well, and these also suffered severely from unmodified small-pox. In

the other three cases the vaccination produced imperfect results and the small-pox was mild. Sidney H. Snell ²_{May 19, '94} saw a case of small-pox in a woman pregnant about eight months and a half. She did well. The child was born about the eighth day of the disease, and exactly six days afterward a vesicular rash appeared, obviously variola. In this case the incubation period was half *in utero* and half after birth (fourteen days).

Vaccination.—W. M. Welch ¹_{Mar. 17, '94} states that vaccination practiced after exposure to the infection of small-pox affords considerable protection. If performed within two or three days after the infection has been received into the system protection may be absolute. Recent vaccination confers almost absolute protection, and vaccination performed in infancy entails revaccination at, if not before, puberty. Unmodified or even severe small-pox in a person who was deeply and characteristically pitted from a previous attack is exceedingly rare.

D. M. Moir, ⁴³⁹_{Feb. 15, '94} considering the difficulties of vaccination from the cow, on account of caste and religious opinions of the Hindoos and the great expense in procuring human vaccine-matter, has inoculated vaccine on kids. The vesicles are not so characteristic as those of the calf or child, nor do they yield so much lymph. A typical vaccine-vesicle on the kid is small, circular, and flat on the top. The best place for inoculation is the scrotum in the male kid and the mamma in the female kid. The same strain of lymph propagated through twelve generations was perfectly good. The effects on a child of vaccination with lymph raised on a kid are similar to those produced by calf-lymph, and the vesicles are just as good. Vaccine-lymph does not take the same time to mature in the kid, the calf, and the child. In the kid, lymph is at its best at the end of the fourth day or beginning of the fifth. Lymph raised from the calf, after previous passage through the kids and children, takes, sometimes, one day longer to ripen. Kids can be successfully vaccinated with lanolin vaccine-paste, with lymph taken from children; children can be successfully inoculated with lymph taken from kids, either the primary inoculation or the secondary eruption; calves can be successfully inoculated with lymph which has passed through both kids and children; lymph which has passed through kids, children, and calves can be preserved with lanolin, and children can be success-

fully vaccinated with lanolin vaccination paste. Lymph raised in children, calves, and kids is identical. Kids and children vaccinated with kid-lymph, when revaccinated with fresh bovine or human lymph, proved insusceptible, thus clearly demonstrating the protection afforded by the primary operation. Kids can be successfully vaccinated from children or from calves; attempts to convey vaccinia from kid to kid have not yet been successful.

Treatment.—Owing to misunderstandings which have arisen as to the treatment of small-pox by colored light, Finsen ³⁷³_{p.238,'94} has formulated the following rules:—

1. The windows and doors must be protected by red curtains or red glass; when the curtains are made of paper or thin material, three or four layers are necessary, but one layer of flannel is sufficient. Red glass of a dark tint, such as used in photographers' lamps, is to be preferred. Electric light and gas are to be avoided, but stearin candles may be used when visiting the patient.

2. The treatment must be commenced as soon as the eruption has appeared, and continued without interruption until the vesicles have dried up.

3. Any other treatment, internal or external, which may be indicated in a given case, can be combined with this treatment.

4. When properly carried out this method will insure a very speedy recovery without scars, even when the case is severe.

Petersen, ³⁷³_{p.116,'93} in connection with this method, states that during the Middle Ages small-pox was successfully treated by means of red curtains. The method was first advocated by the Arab physicians.

Gaddesden, ³⁷³_{p.116,'93} an English physician living about the year 1300, mentions, in his "*Rosa Anglica*," that he cured the Prince of Wales of small-pox "*sine vestigiis*, by making all things red about his bed."

Henric Benckert ³⁷⁰_{v.56, No.7} treated seventeen cases in this manner, twelve being true variola and five varioloid. As a rule, the secondary fever failed to appear. In one case there were traces of slight pitting on the nose, and in another on the fingers. The drying up of the pustules began sooner and the crust fell off more rapidly than is commonly the case. The varioloid forms were less favorably influenced. The results of the treatment (17.6 per cent. mortality) encourage the author to continue his experiments.

A. F. Plicque ⁵⁵_{Jan. 27, '94} proposes an elaborate system of treatment as follows: Cases of medium gravity: insulation, cool room, milk diet; intestinal antiseptics by keeping the bowels easy and giving 4 to 10 wafers a day, each containing beta-naphthol and bisnuth salicylate; baths of 32° to 34° C. (90° to 94° F.), with soap. When the eruption is out, in order to prevent suppuration, washing of the whole body three or four times a day with slightly-tepid boric-acid solution. Ointment of vaselin, 20 grammes (5 drachms); salicylic acid, 1 gramme (15½ grains); in cotton dressings over confluent places. For the conjunctiva boric acid as a wash, and dressings of vaselin, 5 grammes (1¼ drachms); red precipitated mercury, 0.05 gramme ($\frac{7}{8}$ grain). Serious cases: washing with sublimate, 3 to 1000, without alcohol and boricated ointment; gargling with boricated solution or with chloral, 1 to 100; internally perchloride of iron, 20 drops a day in grog.

A. Elder ¹_{Apr. 23, '94} reports three cases, all in children, one vaccinated. They had perfectly well developed small-pox, the vesicles being discrete and a few confluent. When about to pass into the stage of pustulation the disease was aborted by a treatment consisting of cream-of-tartar water as a diuretic, 0.05 or 0.10 gramme ($\frac{7}{8}$ or 1¾ grains) of acetanilid or mixed cinchona salts every fourth hour, and carbolate-of-camphor ointment.

H. Richardière ¹⁷_{Oct. 14, '93} gives baths and local applications of corrosive sublimate for one-fourth hour. In each bath 10 grammes (2½ drachms) of sublimate were used, dissolved in alcohol, two baths a day being given up to the end of the period of suppuration, afterward one a day; and when most of the crusts had dropped, simple baths or those containing boric acid. The face and neck are wrapped in bandages with the same solution of sublimate, not to be taken off during the whole disease and to be kept constantly moist by spraying the solution over them or by moistening them by means of absorbent cotton dipped in the sublimate. Richardière says that, if this dressing be applied from the beginning, suppuration will be prevented in most cases. No other remedy was used, the mortality being 7.5 per cent., or 15 out of 197 cases. Salivation occurred in but 1 case. One patient with multiple abscesses was kept four days in a bath with 300 grammes (9½ ounces) of boricated water at 36° C. (96.8° F.), the water being renewed every twelve hours.

YELLOW FEVER.

The question of the original native place of this disease is not settled. In Mexico it is generally believed that yellow fever was introduced from the Atlantic coast of Africa in 1699 by an English vessel carrying slaves; yet, Clavigero, the historian, affirms that it was not known in Mexico until 1725. Finlay³⁶ July, '94 and le Hardy⁸¹ June, '94 incline to the belief that yellow fever was the plague which created such terrible havoc among Columbus's men and the first Spanish settlers on the coasts of the West Indies. Verrier¹⁴ Apr. 1, '94 asserts, contrary to what is generally believed, that yellow fever was imported from America into Africa; that the first epidemic known there was in 1760, caused by a slave-trading vessel. He believes with Dupont, chief surgeon of the French Navy, that the French settlements of Western Africa are not so unhealthy after all, and that what they call at Sierra Leone the "*Typhus Amaril*" is not yellow fever, but a malignant fever due to the exhaustion of the people, their intemperance, and lack of hygiene. He calls it a "bilious hæmaturic fever." In favor of this opinion he adduces the fact that the American negro is immune from the disease by a long habituation, while the African negro catches yellow fever just as easily as the white man.

At the beginning of the last French expedition to Mexico the troops suffered fearfully from yellow fever; with their inexhaustible humor they called the burial ground of Vera Cruz their "*jardin acclimatation*." At the suggestion of Ehrmann, the chief surgeon, the Viceroy of Egypt was asked to lend a regiment or two of his negro Soudanese troops as a garrison for Vera Cruz, as they were presumed to be immune from yellow fever. He lent them, and, though subject to all other tropical diseases,—dysentery, malarial fever, liver complaints, etc.,—they were proof against yellow-fever contagion. They did excellent service and saved the lives of thousands of the French soldiers.

According to C. Pena,⁶⁷³ Nov., '94 a severe epidemic of this disease occurred in the city of Cordova (50,000 inhabitants), in 1892 and 1893, 1500 deaths being registered in 1893. The fever never originates in Cordova, but is imported and finds a favorable soil if proper precautions be not taken. Sometimes eight or nine years pass without an epidemic, though a few cases occur each year. If the first cases be properly isolated and their belongings destroyed

or carefully disinfected, the spread of the disease will be prevented. The epidemics begin in July and end in November, corresponding more or less to those at Vera Cruz. The mortality in 1893 was 100 per cent. in July, 5 per cent. in August, 12 per cent. in September, 30 per cent. in October, and 2 per cent. in November. With regard to treatment, the mortality by the alkaline method was 7.8 per cent. in 347 cases; by the acid method, 7.82 per cent. in 166 cases. The average mortality in 659 cases was 6.57 per cent.

Finlay, of Havana, ³⁶ July, '94 distinguishes three types or forms: (1) the acclimation fever, or "non-albuminuric yellow fever"; (2) the "plain albuminuric yellow fever"; (3) the "melano-albuminuric yellow fever," characterized by the presence of blood or "black vomit" in the stomach or bowels. The period of incubation he fixes at from three to twenty-five days. A lesion of general character, and to which considerable importance is attributed by competent observers, is a fatty degeneration of the walls of the small blood-vessels and capillaries, which may be the cause of concentration of blood by allowing filtration of the blood-serum through their altered walls. Ernst Aberg, of Stockholm, ⁹⁹⁶ Mar. 10, '94 establishes a strict comparison of facts observed during an epidemic and the laws that rule the vegetable kingdom as a whole, and thinks that he has found a tenable theory of transmission of the disease. He distinguishes three forms: (1) exogenous, where the fever is imported from one place into another; (2) vegetative exogenous, developing in any place after and due to the germination of the former; (3) endogenous, produced by the absorption of the second into the human organism at a given place.

Belinge, of San Francisco, Cal., ¹⁴⁷ Oct., '93 and J. McFadden Gaston, ⁶¹ Jan. 6, '94 plead for Domingo Freire's preventive inoculation with diluted virus. Joaquin de la Pezuela, of Havana, ⁴⁵⁹ Jan., '94 says that abortive cases of yellow fever confer no complete immunity. Albert S. Ashmead ⁵⁹ Oct. 14, '93 recommends Murray's immunizing method, which is as follows: 1. Instead of carrying the patient to the infected region, take the infection to the patient; inoculate with the blood-serum of a partially-immune subject (a negro), and inoculate a second time with perfectly-immune blood-serum of a white subject who has had yellow fever. 2. Expose infected blood-serum to frost before inoculating, and follow this at once with a second

inoculation of immune blood-serum. Frost always modifies the virus.

WEIL'S DISEASE.

Dionisi⁵⁸⁹_{Feb. 24, '94} found, in one case of Weil's disease, special lesions of the hepatic cells and most serious alterations of the cortical substance of the kidneys. In and between the renal epithelial cells there were enormous quantities of bilirubin-crystals. He noticed no alterations in the gall-passages, but only in the parenchyma of the liver, and he holds, with other writers, that the disease is a non-specific poisoning of the gall-passages. F. J. Bosc and C. Guérin⁷³_{June 9, '94} state that a careful study of a case leads them to consider the relapse as a crisis,—an accident favorable to the organism. Their patient was three days without any fever and an apparent improvement had taken place; the liver and spleen, however, remained enlarged, the pulse very frequent, the urine scanty and yellowish green, and one evening the temperature rose to 38.2° C. (100.8° F.) and the pulse to 130. Next morning the temperature was 40.1° C. (104.2° F.), with chills, vomiting, and perspiration. The following day the patient felt much better, the only symptom being some tenderness of the liver, which had not existed before. The authors believe that the so-called relapse is not an interruption of convalescence, but that, the evolution of the disease being finished, a quantity of toxic substance which had accumulated was eliminated under severe feverish reaction of the organism; the urine increased in quantity, became darker in color, and contained enormous quantities of urobilin and urea. On the second day a small quantity—clear and colorless—was secreted, and on the third day, and without fever, 1050 cubic centimetres (1 quart) were passed at a single time, of the same intense color and constitution as on the first day. They conclude that Weil's disease is not a morbid entity, but one of the many forms of infectious icterus, and that the relapse is either a crisis or an hyperintoxication due to an aborted crisis.

Freyhan⁴⁷⁵_{Feb. 74; Feb. 24} relates quite a typical case. A man, aged 32 years, was suddenly seized with shivering, fever, headache, followed by semicoma, and next day had jaundice, dry and coated tongue, temperature of 38.9° C. (102° F.); pulse, 100. The urine was dark, containing bile-pigment, a trace of albumin, some hyaline casts, and a few red and white cells. The liver and spleen

were enlarged, the stools loose and passed unconsciously. The fever terminated by lysis in a few days, the other symptoms disappearing at the same time, severe pains occurring in the calves. Men are oftener attacked than women. Relapses sometimes occur, but rarely in such a severe form. The pulse during convalescence is not frequent, probably owing to the presence of bile-constituents in the blood. Severe cerebral symptoms are rarely absent; jaundice is the most constant symptom. The liver is not always enlarged, the spleen being oftener affected. The nephritis is toxic in nature, as in other infective processes. Muscular pains, due to myositis, are almost always present. The prognosis is good. Neither morbid anatomy nor bacteriology has as yet given definite information as to the exact nature of the disease. It has been looked upon as abortive enteric fever with jaundice, but the typical lesions of the latter have never been found. It differs from septicæmia in several ways, and its resemblance to acute yellow atrophy is quite superficial. From infective jaundice the difficulties of diagnosis may be considerable. Those believing exclusively in the infective origin of jaundice look upon Weil's disease as only a severe form of this affection. The clinical picture of catarrhal jaundice, even when accompanied by fever, is very different from that of Weil's disease. Some have looked upon it as the sporadic form of this disease. Only the discovery of a specific agent will settle the question.

DIPHTHERIA, CROUP, PERTUSSIS, AND PAROTITIS.

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DIPHTHERIA.

Bacteriology.—In the investigation of diphtheria during the last year more attention than formerly has been devoted to what is designated as a mixed infection, or the occurrence in the diphtheritic patient of other pathogenic germs, together with the Lœffler bacillus. H. Barbier⁵⁵_{Sept. 30, '94} states that probably the most common of the associated pathogenic microbes modifying the clinical history of this disease is the streptococcus, apparently the streptococcus pyogenes. He believes that, in the severe and most highly infectious forms of diphtheria accompanied by marked hyperæmia and swelling of the faucial and adjacent surfaces, streptococci occur not only in the superficial, inflamed parts, but in the deeper, contiguous tissues, which are involved in the inflammatory process, as the submaxillary and perilaryngeal glands and the adjacent connective tissue. In some cases these adventitious germs, by penetrating deeply, cause not only a cellulitis which may end in suppuration, but set up a broncho-pneumonia, greatly diminishing the chances of recovery. Recent writers of the highest authority largely attribute the severity and mortality of diphtheria to these accessory germs, which, entering the lymphatic and circulatory channels with the toxin generated by the Lœffler bacillus, dangerously infect the blood and cause inflammations which antitoxic serum and other remedies are unable to control.

From an examination of the bacteria in 400 cases of inflammation of the throat in diphtheria and scarlet fever, John E. Morse concludes that scarlatinous angina is always accompanied by cocci, usually streptococci. Baginsky did not find the Lœffler bacillus in scarlet fever, and thinks that it disappears in diphtheria and gives place to cocci when a scarlatiniform eruption appears. Booker found forms of cocci in scarlatinal pseudo-

membranous angina without the Læffler bacillus. In 99 cases of scarlet fever, with simultaneous pseudomembranous inflammation of the fauces, the following bacteria were found:—

Klebs-Læffler bacilli alone,	3
Klebs-Læffler bacilli and streptococci,	1
Klebs-Læffler bacilli and staphylococci,	10
Klebs-Læffler bacilli, streptococci, and staphylococci,	9
Streptococci alone,	4
Staphylococci alone,	12
Streptococci and staphylococci,	23
Streptococci, staphylococci, and other microbes,	34
Other bacteria,	3

W. H. Park, of New York, ⁵⁹_{Aug. 18, '94} after an extended review of the results of others, is more than ever inclined to believe that there are several varieties of bacilli grouped under the name of pseudodiphtheria bacilli; for, otherwise, how could some observers affirm that the bacilli cause alkaline bouillon to become acid, while others, equally reliable, assert that it becomes alkaline; or that some should find them to be identical in all morphological and cultural characteristics with the Læffler bacilli, while others find distinct and constant differences? In a large number of experiments carried out in the laboratory by Alfred L. Beebe and himself, they had met with numerous examples of all the forms described. Cultures from 330 non-diphtheritic throats gave, in 22, virulent Læffler bacilli; in 21, non-virulent characteristic bacilli, and, in 28, Hofman's pseudobacilli. Park makes the following classification of these organisms:—

1. *Læffler's Diphtheria Bacilli*.—Found in cases of true diphtheria and in persons brought in contact with them. They all produce the toxins described by Læffler, Roux, Fränkel, and others. They are subdivided into (a) bacilli characteristic in growth, shape, and staining, and (b) bacilli not characteristic, but still having the recognized slight variations only. All these produce acid in their growths in broth.

2. *Probably Læffler's Diphtheria Bacilli*.—They agree with the above classes in every way except that they have no virulence when injected in animals, and do not produce the toxins. They are found in healthy throats.

3. *Probably Not Læffler's Diphtheria Bacilli*.—The growth on agar and serum is far more luxuriant than is ever seen with true bacilli. They first make the litmus cloudy and then give the

acid reaction. They are subdivided into (*a*) shorter, plumper bacilli, which usually stain evenly. They grow rather more quickly on agar, frequently give rise for the first twenty-four hours to a cloudy broth, and give an alkaline reaction with litmus-bouillon. (Probably a subdivision could be made here into those causing a luxuriant growth on agar and those not causing a luxuriant growth, and which are plumper.) (*b*). Bacilli shorter and plumper than is usual in Lœffler's bacilli, but taking a fairly-characteristic stain. This third class is found in healthy throats, and more rarely with diphtheria bacilli in cases of diphtheria.

If these cultures were followed up for six weeks they would be found to become less and less virulent, while retaining their morphological appearances. He had not examined them after six weeks, but at this time they were apparently in about the same condition as in children in whom they had been found, and yet who had not developed any symptoms of diphtheria. The diagnosis was made chiefly on the stain and the varied size and shape of the bacilli. These characters ranked next in diagnostic value to animal inoculations.

Veillon ³_{Sept. 29, '93} ¹¹²_{Feb., '94} divides the conditions due to the different organisms as follows: Local accidents due to the Lœffler bacillus, general accidents due to the toxin, and accidents due to infection by adventitious germs.

According to G. S. Woodhead ⁶_{Dec. 15, '94} the Klebs-Lœffler bacillus usually occurs in the false membrane as small rods about three to six micromillimetres in length, slightly shorter than the tubercle bacillus, but from one and a half times to twice as thick as that organism. It is straight or slightly curved, and usually somewhat enlarged and rounded at the ends, which are more deeply stained than the central portion. It occurs singly or in groups, sometimes forming a kind of interlacing reticulum when in sufficient numbers, or grouped in irregular masses of considerable size. In a case of true diphtheria these bacilli are almost invariably found on the surface of the false membrane, whilst in other cases they are situated somewhat more deeply, but are seldom, if ever, found in the mucosa,—that is, the true mucous membrane,—from which they are separated, according to Lœffler, Roux and Yersin, and Ruffer, by a layer of fibrinous lymph, in which are found numerous leucocytes. Although this statement is, in the main, correct, it

must not be forgotten that the highest authorities in bacteriology state that the Klebs-Löffler bacillus in rare instances has been found in the interior of the body.

The Löffler Bacillus Outside of the Body.—Wright and Emerson⁵⁰_{B.16, No. 10, '94} examined the dust upon the floor of the diphtheria pavilion of the Boston City Hospital and upon the clothing and persons of the attendants, to determine if the bacilli of diphtheria were present. Four cultures were made from the floor-sweepings, and in only one did the examination reveal the presence of the Löffler bacillus, although other bacteria were present. In four examinations of the dust adherent to the shoes of the attendants three showed the presence of the Löffler bacillus, with other bacteria. Cultures were made from the hair of the attendants in four cases, with positive results in one. Examination of the margins of the dresses of the attendants, of the bed-clothes, shirts of patients, and of the finger-nails of attendants were negative as regards bacilli, as was also the examination of the air of the pavilion. In two of the five examinations in which bacilli were found their virulence was slight.

Modes of Contagion.—H. G. Sutton⁶_{Jan. 19, '94} states that in the parish of Upchurch, England, immense quantities of refuse are brought in barges from London and dumped on the quay, forming immense heaps, sometimes to the height of fifteen feet. The ashes obtained by sifting is used in the manufacture of bricks, and the residue, consisting of rubbish and filth, is burnt, producing an abominable stench. The smoldering refuse continues for weeks, and the noxious fumes are conveyed hither and thither by the winds. In one direction the fumes extended over the village, in which diphtheria occurred. After a full investigation, Sutton expresses the opinion that the diphtheria originated from the noxious fumes arising from the smoldering heap of refuse.

W. A. Dixon⁶¹_{Dec. 2, '93} relates the following cases: "In 1865 I saw many cases of diphtheria in children living in the country, perfectly isolated from diphtheritic sick. They had no opportunity in any way to be infected by other children. In the family of Mr. G., a well-to-do farmer, the children were seized suddenly with violent and malignant symptoms of diphtheria. The chickens on this farm were sick and dying with a disease affecting the throat. As they sickened they were brought to the house and given a

corner in the kitchen, where the majority of them died. The children spent most of their time with the sick chickens. The first child seized died early with laryngeal stenosis. The remaining three recovered, but each had characteristic paralysis and convalescence was slow.

“ Another case was a child in the family of Mr. S., whose home was perfectly isolated. The child had no possible chance of infection, living far from any case of diphtheria. This child had a pet cat, which it nursed continually. The cat had been ill some days prior to the child's attack and had a discharge from the nostrils. The eyes were sore; it coughed and sneezed. The glands of the neck were enlarged. It died about the time the child was taken sick. In this neighborhood hogs and chickens also were dying at this time, of a disease the farmers called cholera. The child exhibited all the symptoms of malignant diphtheria, with extensive membranous deposit and enlargement of the cervical glands, and died, within seventy-two hours, of laryngeal stenosis.

“ In the family of Mr. F., living on a high hill in a secluded locality, the children were seized with well-marked symptoms of diphtheria, malignant in type. This instance is notable, because at the time there were no cases of diphtheria in all the country about. The children were really isolated in the strictest sense. The family had canary-birds. The birds were sick; some of them died. Paralysis of one or both feet supervened in those which recovered. The fowls on the premises also were sick, many dying of a similar affection. It is reasonable to conclude that the children were infected from the birds and fowls. The following year I met with true diphtheria in the family of Mr. M., living in an out-of-the-way place, thoroughly secluded from contagion, except from sick and dying fowls.

“ In 1869, a farmer, Mr. K., had a large number of hogs die of what was called cholera. At his request I visited his farm and found about thirty hogs, well fattened, dead, and many more sick. They were taken with a cough, humid breathing, and had discharge of frothy mucus from the nostrils and mouth. They rested on the abdomen with feet drawn up under them. Many of them had difficult breathing and crowing inspiration. We opened the thirty dead hogs to obtain some clearer idea as to the character of the disease, and found, in each, inflammation of the larynx, gran-

ular infiltration, spots of ulceration, and patches of membranous deposit. In many the trachea was inflamed and quite filled with exudation. In some there were inflammatory products in the lungs. Very few showed any lesion of the alimentary canal. This malady among the hogs was followed by an epidemic of true diphtheria in all that region, and by severe sore throat without membranous deposit."

The inhalation of sewer-gas wherever diphtheria prevails has been regarded as a common cause of this disease. For this reason the following investigations relating to the nature of sewer-gas are instructive and important: J. Parry Laws⁶_{Mar. 24, '94} presented to the Main Drainage Committee of the London County Council the results of his investigations on the composition of sewer-gas. His examinations, as well as those previously made by Carnelly and Haldane, showed that the air of sewers was much better than might have been expected. The proportion of carbonic-acid gas was about twice, and of organic matter about three times, that contained in the outside air. The number of micro-organisms was less in the sewer-air than in the outside air at the same time. The air of the sewers was in a much better condition than that of naturally-ventilated schools, and, except as regards organic matter, in a better state than that of mechanically-ventilated school-rooms. Moreover, the sewer-air contained a much smaller number of micro-organisms than the air examined in domiciles. Laws found that the micro-organisms of sewer-air are related to the micro-organisms in the air outside, and not to those in the sewage. In the air within and without, the forms of micro-organisms present are almost wholly molds and micrococci, while the micrococci of sewage are mostly bacilli. He believes that, in the absence of violent splashing, there is little or no reason to think that the micro-organisms of sewage are disseminated in the sewer-air. A repetition of his experiments gave the same results. He also found that a considerable increase in the velocity of the air-currents did not increase the number of micro-organisms found in the sewer-air, and that the results of experiments were the same in small as in large sewers, and led to the belief that all micro-organisms in sewage-air are non-pathogenic.

An editorial writer⁶_{Sept. 29, '94} refers to the use of slates in the public schools, which pupils are apt to clean with their saliva, as a means

of disseminating diphtheria. The common use of the drinking-cup in the schools is also another mode.

Discussion of Diphtheria at Budapest.—At the meeting of the Section of Bacteriology of the Eighth International Congress of Hygiene and Demography, at Budapest, September 2, 1894, Loeffler ⁶_{Sept. 8, '94} presented the report of the German committee and urged the necessity of bacterial examination in all cases of suspected diphtheria, stating, what is well known, that the presence of the Loeffler bacillus is a sure sign that the accompanying pseudomembranous inflammation is diphtheritic; that the bacillus of diphtheria may be present without causing symptoms of the disease; that the bacillus may disappear when the symptoms cease, or may continue in a virulent state for months upon the fauces of the infected individual. The committee also reported that the bacillus of diphtheria was found to have such vitality that it remains alive outside the body, if fostered by dirt and darkness, and retains its mischievous power to generate the disease. Hence, clean, airy, and well-lighted apartments, with proper domiciliary and personal disinfection, afford the greatest protection against the spread of the disease.

Prevalence.—Edward Seaton presented the report of the British committee to the same Congress, laying stress on the fact that diphtheria, in the last decade, has become more prevalent, for which overcrowding is largely responsible; and he regrets the fact that the British public do not properly appreciate the importance of preventive measures. Billings presented the report of the American committee, his statistics showing that diphtheria in the United States is chiefly an urban disease, and that the general mortality from it is diminishing. M. A. Adams stated that, during the nine years ending with 1893, a “strict concordance could be traced between soil-dampness and diphtheria on the one hand, and absence of diphtheria and soil-dryness on the other.”

J. F. J. Sykes ⁶_{July 14, '94} publishes the following table of the deaths from diphtheria in London per million inhabitants:—

Years.	Number of Deaths.
1888,	319
1889,	391
1890,	331
1891,	340
1892,	440
1893,	758

Complications.—S. Fenwick²_{Dec. 23, '93}⁶⁷³_{p. 12, '94} exhibited a specimen of diphtheria of the stomach in a child, aged 3 years, who died of dyspnœa, although tracheotomy had been performed. There was no pseudomembrane on the tonsils or pharynx, and none in the œsophagus. The interior of the stomach was lined with a pseudomembrane which, under the microscope, showed the usual histological characters of diphtheritic membranes. There was considerable increase in the lymphoid tissue of the mucous membrane itself. This location of the diphtheritic exudate has been rarely observed in young adults, more frequently in children.

Stscherbak⁸¹⁴_{Jan. 13, '94} experimented on rabbits and guinea-pigs, inoculating them with diphtheritic bouillon cultures or their filtrate. Many alterations in the nervous system followed, such as hæmorrhages in the spinal meninges and in the gray matter of the cord, acute inflammation of the latter, degenerative changes in the spinal roots, neuritis of peripheral nerves, and changes in the muscles, both parenchymatous and interstitial. In all the cases in which paralysis followed inoculation in these animals changes in the peripheral nerves were found, the intensity and extent of the neuritis corresponding generally with the degree and locality of the paralysis.

W. Gay⁶_{Oct. 21, '93} relates the case of a female patient, aged 13 years, who had a severe attack of pharyngeal diphtheria, so virulent that her condition was regarded as hopeless. She, however, gradually recovered; but, four or five weeks from the commencement of the disease, fluids regurgitated through the nose, and her once-shrill voice was reduced to a falsetto whisper. Soon her near vision was deranged, and diplopia supervened. The pupils were widely dilated. There was, at this time, no actual paralysis, but a general weakness. She was unequal to any exertion, and stumbled about in walking, supporting herself by the various objects she passed. Standing with her feet together and eyes shut, she would have fallen if not caught. She had ataxia of all the limbs and loss of the reflexes. Slight touches were not felt, but the sensation produced by firm pressure was referred to "exactly corresponding points on the opposite side of the body." This strange and infrequent transposition of pain or other sensations from one side of the body to the corresponding nerves of the opposite side was designated, by Obersteiner, "sensory allochiria."

W. R. Townsend¹_{Feb. 24, '94} presented, to the Bellevue Alumni Association of New York, a little girl who had been brought to the Hospital for Ruptured and Crippled, with a diagnosis of Pott's disease. It had been found that the child had had diphtheria in November, 1893, and had recovered from it, but that one or two weeks afterward she had fallen from her chair, the head dropping forward. In the past year or two a number of cases had been seen at the hospital in which the diphtheritic poison had affected the posterior muscles of the neck, allowing of a dropping forward of the head and an undue prominence of the cervical vertebræ. If this were a case of Pott's disease it would be impossible to put the head into normal position by simply lifting it with the hand, and, moreover, there would be thickening of the vertebræ. Another important distinguishing feature was that in the morning, on awakening, the child was able to hold up the head better than later in the day. Again, in Pott's disease there was much pain if the head were moved, and marked spasm of the spinal muscles. In this case both these symptoms were absent. The position of the head was also slightly different from that usually found in Pott's disease; the chin pointed toward the chest and was exactly in the median line, while the majority of cases of cervical bone disease deviated to one or the other side. The sudden onset and the previous history of diphtheria were also aids to the diagnosis.

Hill⁶_{June 9, '94} publishes the case of a man, aged 40 years, who had a pseudomembrane on an old eczematous patch near the anus, followed by typical post-diphtheritic paralysis. There had been no pseudomembrane upon the pharynx. The case is interesting on account of this fact.

Diagnosis and Prognosis.—H. M. Biggs¹¹_{Sept., '94} read an instructive paper, at the Congress of the British Institute of Public Health, giving an account of the methods pursued by the New York Health Board in diphtheria. The plan adopted originated from the need, long felt by physicians, of some mode of differentiating diphtheria from other diseases which resemble it, but are distinct. Cases of the acute, infectious disease in New York, when the diagnosis was confirmed by inspectors, have generally been conveyed to the Willard Parker Hospital, which is designed for the reception and treatment of such cases. When bacteriological examinations were made of all these patients, it was shown that from 30 to 50 per cent. of

them did not have true diphtheria, but pseudodiphtheria, or pellicular inflammation, caused by forms of cocci, especially the streptococcus. When bacteriological examinations showed the absence of the Klebs-Löffler bacillus, the mortality was from 1 to 5 per cent., death resulting usually from broncho-pneumonia. In true diphtheria, or that form of pseudomembranous inflammation caused by the Löffler bacillus, the deaths were from 20 to nearly 50 per cent. It was also proven by examination that there is very little danger of communication or propagation to others if the disease is not produced by the Löffler bacillus; but if this organism be present and the malady be true diphtheria, even in its mildest form, the liability of its propagation, perhaps in a severe and dangerous form, is very great.

The bacteriological work of Baginsky and Martin in Europe, and of Koplik, Park, and Biggs in the United States, demonstrates that cultures of the material obtained from a case show positively, in from twelve to twenty-four hours, whether the disease be true diphtheria or pseudodiphtheria. Since early in May, 1893, culture-tubes, each containing the proper material for the culture, with a swab for brushing the throat, have been left at convenient places in every part of the city of New York. The physician who requires the bacterial examination of a patient obtains a tube with the swab, consisting of a stiff wire terminating in a pledget of cotton. This cotton is pressed upon the inflamed surface and is then allowed to rest on the culture-material in the culture-tube, which is closed by the sterilized cotton, and is soon in the hands of the bacteriologists of the Health Board. The following is a brief statement of the important work accomplished:—

“During the past three months 405 cases of true diphtheria have been subjected to repeated bacteriological examinations performed at short intervals during the course of the disease and during convalescence. In all of these cases cultures were made at the beginning of the disease, again after the lapse of three or four days, and, finally, at short periods after the complete disappearance of the false membrane, until the throat was found to be free from the diphtheria bacillus. In 245 of these 405 cases the diphtheria bacilli disappeared within three days after the complete separation of the false membrane; in 160 cases the diphtheria bacilli persisted for a longer time,—namely, in 103 cases for seven days; in 34

cases for twelve days; in 16 cases for fifteen days; in 4 for three weeks, and in 3 for five weeks after the time when the exudation had completely disappeared from the upper air-passages. In many of these cases the patients were apparently well many days before the infectious agent had disappeared from the throat. These results show that in a considerable proportion of cases persons who have had diphtheria continue to carry the germs of the disease in their throats for many days after all signs and symptoms of the disease have disappeared. No doubt the disease is largely disseminated by these persons who are apparently well, and who mingle with others while their throat-secretions still contain the diphtheria bacilli.

“These experiments have led the Health Department to adopt the rule that no person who has suffered from diphtheria shall be considered free from contagion until it has been shown by bacteriological examination, made after the disappearance of the membrane from the throat, that the throat-secretions no longer contain the diphtheria bacilli, and that, until such examinations have shown such absence, all cases in boarding-houses, hotels, and tenement-houses must remain isolated and under observation. Disinfection of the premises, therefore, will not be performed by the Department until examination has shown the absence of the organisms.

“Secondary cultures, as in the case of primary cultures, may be made by the attending physician, if he so desires; otherwise they will be made by the inspector of the district in which the case occurs. This applies only to cases occurring in boarding-houses, hotels, and tenement-houses,—not to those in private houses.

“In this connection an interesting observation has been made, showing that, in diphtheria cases which have been subjected to frequent irrigation with antiseptic solutions from the beginning of the disease, the bacilli disappear far more rapidly than in those in which such irrigations have not been employed. It has been also noticed that occasionally when culture-tubes are inoculated immediately after irrigation of the throat with antiseptic solutions the cultures do not show any Lœffler bacilli, although subsequent examinations may demonstrate their presence. This observation should be noted in making inoculations.”

G. S. Woodhead ⁶_{Dec. 15, '94} states that under the management of the Metropolitan Asylum Board of London “there is sent out

from the laboratory to the various hospitals under the management of the Board, as required, small cases containing (*a*) a test-tube (plugged with sterilized cotton-wadding), in which is a quantity of suitable, solidified nutrient medium, carefully sterilized; and (*b*) a second tube, also plugged with cotton-wadding, in which is held a small soft-steel rod, roughened at the end, but tipped with a pledget of cotton-wadding, the whole being carefully sterilized by dry heat." The tube, when returned to the laboratory, is placed in an incubator twelve to twenty hours, when the cultures are sufficiently developed for microscopical examination.

Treatment.—During the last year, as in preceding years, a considerable number of new remedies have been recommended for the treatment of diphtheria, but the time and space occupied in describing their mode of use and the results can be more profitably occupied by considering "antitoxic serum," its nature, mode of employment, and results of treatment.

E. Roux, in his communication to the Eighth International Congress of Hygiene and Demography, at Budapest, ⁶⁷³_{p.289,94} states that when the diphtheritic pseudomembrane appears upon parts that are not visible the disease manifests itself by blood-poisoning, indicated by pallor, albuminuria, and respiratory and cardiac disturbances. If diphtheria be not early diagnosticated and be well advanced, antitoxin cannot be expected to be efficacious. He describes the method of preparing the serum as follows: The animal furnishing it, usually the horse or goat, is rendered immune against diphtheria,—that is to say, it is rendered accustomed to the toxin of diphtheria. The preparation of antitoxin forms the basis of the treatment, and it is the more necessary to describe it because it requires a large quantity of the diphtheritic toxin to immunize large animals and to maintain their serum at a sufficient degree of activity. The most rapid method for obtaining the toxin employed for inoculating the animal consists in making a culture in a current of moist air. Vessels with flat bottoms and with lateral tubes are used; into these is poured an alkaline bouillon, peptonized to 2 per cent., the liquid being spread into a thin layer. "After sterilization, recent and very virulent diphtheria bacilli are added and the temperature of the chamber is raised to 37° C. (98.6° F.). When the development has fully commenced, in a manner easily imagined, the current of air that passes

into the neck of each of the phials is regulated after passing through a wash-bottle. After three weeks or, at most, a month, the culture is sufficiently strong for use. . . . Since 1892 we have immunized several horses, producing very efficacious serum. Some have been brought to such a degree of immunity in less than three months that they have borne, without suffering, 300 cubic centimetres ($9\frac{1}{2}$ fluidounces) of diphtheritic toxin injected into the veins at one time. The immunization of horses is therefore very simple. The pure toxin is injected under the skin, commencing with 1 cubic centimetre ($15\frac{1}{2}$ minims) and progressively increasing the quantity. At the end of a month, two or three times a week from 20 to 30 cubic centimetres (5 to 8 fluidrachms) are injected at each sitting. . . . Horses also bear very well inoculations of living and very virulent diphtheritic bacilli. . . . These inoculations, after being repeated a great number of times, always give rise to the same symptoms, until a period is reached at which the fever following the inoculations is insignificant, and the much-reduced local lesion terminates in suppuration. Then large doses of virulent culture introduced into the veins only provoke a fleeting rise of temperature." After the serum of the animal is rendered immune by repeated injections, extending over three months to two years, it is ready for the treatment of patients.

Roux states that before treating children with the serum it is tested upon animals. The serum not only prevents general poisoning, but its action on the local lesion is most marked. That form of diphtheritic disease in children which is dreaded above all others by the laity as well as physicians—to wit, pseudomembranous laryngo-tracheitis—experiments have shown to be more amenable to treatment by the antitoxic serum than by any or all other medicines. Roux says: "Rabbits to which tracheal diphtheria has been communicated (by injection of the diphtheritic material) die in from three to five days if not treated. Those receiving serum in sufficient quantity, even twelve or twenty-four hours after the injection, recover. Diphtheria associated with streptococci is the gravest form met with; in children it is the most frequent determining factor of broncho-pneumonia, and the same holds good among rabbits." He believes that treatment begun in the first twelve hours, by repeated and large injections of the serum, may arrest these cases of mixed infection in which both pathogenic

germs—the Lœffler bacillus and streptococcus—are present and broncho-pneumonia is likely to supervene. But “our rabbits, treated after twelve hours, have succumbed, in the great majority of cases, with centres of broncho-pneumonia, in which were found microscopically the Klebs-Lœffler bacillus associated with the streptococcus.”

Roux gives the statistics of treatment with antitoxin at the Hôpital des Enfants Malades, Paris. From February 1 to July 24, 1894, 448 children were thus treated, the mortality being 109, or 24.33 per cent. The average mortality from 1890 to 1894 was 51.71 per cent. in a total of 3971 children. The benefit from the antitoxin treatment, the conditions being the same, was therefore 27.38 per cent. Within the same period 500 cases of diphtheria were entered at the Hôpital Trousseau, 316, or 63.20 per cent., of whom died. Of the 448 children treated by antitoxin, 128 were found, by bacteriological examination, not to be suffering from true diphtheria; 20 other cases were in a dying condition when brought in. Of the 300 cases remaining there were 78 deaths, or 26 per cent., instead of 50 per cent., as in former statistics, before the use of antitoxin. The serum used was taken from immunized horses, with a strength of between 50,000 and 100,000. Of this 20 cubic centimetres (5 drachms) were injected under the skin of the thigh. This was not renewed if the patient were found not to be suffering from true diphtheria; otherwise, a second injection was made twenty-four hours later, 0.10 to 0.20 gramme ($1\frac{1}{2}$ to 3 minims) being used. This was usually sufficient to bring about recovery. If the temperature remained elevated, however, a third injection of the same amount was made. The average weight of the children being 14 kilogrammes (28 pounds), the amount of serum injected, as a general rule, equalled $\frac{1}{10000}$ part of their body-weight, and in exceptional cases $\frac{1}{1000}$ part. Under the influence of the injections the general condition remained excellent; the false membranes ceased to form within twenty-four hours after the first treatment; in thirty-six or at most seventy-two hours they became detached. In only 7 of the cases did they persist longer. The temperature frequently fell suddenly after the first injection; if it remained elevated in the cases of severe angina, it fell only after the second or third injection, in lysis. The pulse returned to normal less rapidly than the temperature. A third of the cases

of diphtheria, according to statistics, show albuminuria; and this having been present in only 54 out of the 120 cases treated with serum, it seemed evident to Roux that the remedy diminished the frequency of the symptom. The mortality in cases of croup treated with the serum was also much less than with other methods.

In mixed infection, in which the streptococcus and Loeffler bacillus are associated, the antitoxic serum is less efficacious than in those cases in which the streptococcus is absent. Roux states, as the result of his observations, that when the diphtheritic inflammation extends to the larynx and tracheotomy is necessary the injections should be more abundant and more numerous. In the majority of cases thus treated the diphtheritic exudate disappears more rapidly from the larynx and trachea, and the cannula can ordinarily be withdrawn on the third or fourth day.

Tubage being an American invention, the American reader will be pleased when he reads the following sentences with which Roux terminates his highly-instructive paper: "How many children may be spared tracheotomy if the serum were administered sooner? We can even say that, with the use of serum, tracheotomy should, in the great majority of cases, be replaced by intubation. It is now no longer a question of leaving the tube in the larynx for days. It will suffice more frequently to retain it for twenty-four or forty-eight hours, to prevent imminent asphyxia and to give time for the false membranes to become detached. Intubation is the complement of the serum treatment of the future. Tracheotomy will be the exception, and greatly to the benefit of the children."

A. I. H. Saw, of London, ⁶_{Oct.13,'94} relates six cases of diphtheritic croup treated by tracheotomy and Aronson's antitoxin. All except an infant of 11 months, moribund on admission, recovered rapidly. At a meeting of the Brighton Medico-Chirurgical Society held October 4th, Richardson and Hollis each related two cases in which the antitoxin was employed, with speedy recovery in all. One of Hollis's cases was cyanotic from croup and was tracheotomized before the antitoxin was injected.

I. A. Turner ⁶_{Nov.24,'94} has collected the following statistics of the antitoxin treatment: Behring and Kossel, 30 cases, with a mortality of 20 per 100; Ehrlich, Kossel, and Wasserman, 67 cases with

tracheotomy, with a mortality of 23.6 per 100; Kartz, 123 cases, with a mortality of 13.2 per 100; Weilger, 63 cases, with a mortality of 28 per 100; Aronson, 192 cases, with a mortality of 13 per 100; Roux, 448 cases, with a mortality of 24.3 per 100. This gives a total of 1081 cases, with a mortality of 24 per 100.

At a recent meeting of the Royal Society of Physicians of Vienna, Widerhofer¹¹³_{No. 52, '94} reported the results obtained in 100 severe cases of diphtheria treated during October and November with antitoxin. Of this number 74 recovered, 24 died, and 2 were yet under observation. Diphtheria bacilli were found in all the cases except 4, 2 of which were not examined bacteriologically. In the preceding nine months the mortality had been 52.6 per cent.; for the corresponding two months of 1893, 44 per cent.; of 1892, 39 per cent.; and of 1891, 34.2 per cent. From 1862 the mortality has fluctuated between 32.3 per cent. and 71.9 per cent.

At a meeting of the Clinical Society of London, MacCombie stated²_{Dec. 29, '94} that, of 31 cases of diphtheria treated with antitoxin, 3 had died and probably 1 more would prove fatal. During the period of treatment a total of 54 cases came under observation; but in some on account of the lateness of the period, and in others on account of the age, antitoxin was not used. Among the whole number 7 died. During the preceding months of 1894, without the antitoxin treatment, the result was as follows:—

In January,	cases, 21; percentage of deaths, 42.
In February,	" 17; " " 35.
In March,	" 16; " " 31.
In April,	" 24; " " 29.
In May,	" 23; " " 30.
In June,	" 32; " " 34.
In July,	" 70; " " 37.
In August,	" 43; " " 18.
In September,	" 57; " " 29.
In October,	" 48; " " 25.
In November,	" 23; " " 25.

J. L. S.

CROUP.

Etiology and Diagnosis.—In several States of the Union the boards of health have established the plan of calling all cases of croup diphtheria. The reasonableness of this is plain. The beginning of diphtheria is often manifested by an attack of laryngeal stenosis, more or less marked, which may speedily result in death

before a bacteriological examination may be made, and thereby place in jeopardy the lives of many who come in contact with a supposed case of simple membranous croup. H. M. Biggs, ¹_{Nov. 11, '93} in a letter to the President of the New York Board of Health, states that during four months bacteriological examinations had been made in 36 cases of this kind. In all of these the membrane was either confined entirely to the larynx or, at most, only slight deposits existed in the throat, while there was very extensive exudation in the larynx. In 30 of the cases the Lœffler bacillus was present; they were, therefore, really cases of laryngeal diphtheria. Thus, 84 per cent. of the cases which were supposed to be simple membranous croup, analogous to non-diphtheritic pseudomembranous inflammation in the pharynx, proved to be true diphtheria. In a further communication Biggs ¹_{May 12, '94} says that more extended observation and careful examination of many cases justify the Board of Health in considering so-called membranous croup as laryngeal diphtheria. Of 286 cases of membranous croup which were bacteriologically examined, the Lœffler bacilli were found in 229. Of these 229 cases no membrane existed above the larynx. Of the 57 cases examined in which no Lœffler bacilli were found, in 17 the cultures were unsatisfactory.

Atmospheric conditions play an important part in the origin and development of membranous croup. Dunn ⁸¹_{Mar., '94} believes that "the disease takes its origin in a congested condition of the adenoid layer of the laryngeal mucous membrane, whose congested condition owes its existence to circulatory disturbances, brought about by the unequal application of moist, low temperature to different parts of the body."

Treatment.—Intubation, like all new surgical procedures, has many bitter enemies as well as friends, and undoubtedly its unpopularity is caused, in many instances, by lack of familiarity, on the part of the operator, with the technique. Still, it remains to-day the greatest and surest means at our disposal of combating most successfully the frightful death-rate of true croup.

Dunn ¹¹⁰_{Apr., '94} advises tracheotomy for practitioners who have not had much experience in intubating cases of laryngeal stenosis, and recommends the low operation below the isthmus. He emphasizes a point which many have emphasized before,—not to wait until the child is in *articulo mortis*. The use of pilocarpine in

doses of $\frac{1}{24}$ grain (0.0027 gramme) every four hours should be given if the patient is robust and seen early in the course of the disease.

Detweiler²⁰²_{Aug. 10, '94} advocates the application of leeches, followed by a cantharidal blister, and internally the administration of calomel in $\frac{1}{4}$ -grain (0.016 gramme) doses every half-hour until the characteristic green stools are secured.

Guelpa²⁴_{Oct. 8, '93} advises laryngo-tracheal irrigations following tracheotomy, his method being as follows: The child is held on the lap of a nurse, with the head low, as in the process of feeding after intubation, a small tube is inserted into the cannula, and this tube connected with a fountain-syringe. The returning fluid passes out of the cannula along-side of the small tube, or, if the larynx be not completely occluded, by the nose and mouth. The author states that there is absolutely no danger from this procedure when properly performed, and the results are much better. It appears to me, however, to be a risky measure, and should be attempted with great caution.

Wharton⁶⁵_{Aug., '93} reports a case of diphtheritic croup in which a tracheotomy tube was worn for sixty days. During this time repeated efforts were made to dispense with it, but the child invariably choked up again. Finally the patient was etherized, the tracheotomy wound enlarged, and found to be surrounded by a mass of granulation tissue. This was removed, the base touched with a solid stick of nitrate of silver, and an intubation tube introduced. The child made an uninterrupted recovery.

Tracheotomy is seldom of avail when the patient is under the age of 2 years; but Breton¹¹⁸_{Mar., '94} reports two successful cases in infants only 6 and 7 months old, respectively. Curettage of the trachea was done by Scudder⁹⁹_{Nov. 9, '93} in a case which had been already tracheotomized, but in which there was manifest obstruction below the tracheotomy wound. The tubes were removed, a dull, wire, uterine enrette was introduced through the opening, and the trachea rapidly and thoroughly scraped. Pieces of membrane were withdrawn, hæmorrhage being slight, and relief immediate. The patient made a good recovery. Rhythmical traction of the tongue after the method of Laborde¹⁰_{Nov. 28, '93} has been practiced in three cases of asphyxia, following tracheotomy, at the Trousseau Hospital, Paris, with good results. In the first case the child

inspired at the sixth traction, in the second about the tenth or twelfth traction, and in the third case the method was used in conjunction with Sylvester's method for artificial respiration.

The position of the patient in the treatment of croup is considered by Guelpa²⁴_{Dec.24,'93} as of great importance. He believes that the head should be maintained at a lower level than the rest of the body in order, by utilizing the physical law of gravity, to prevent the migration of the croupal pathogenic bacteria to the bronchial extremities and the supervention of broncho-pneumonia.

PERTUSSIS.

Cohn and Neumann¹⁵⁸_{v.17,p.24} examined the expectoration in 24 cases of whooping-cough from 1 to 10 years of age. At the end of a spasm the sputum was placed in a Petri glass, thoroughly washed with distilled water, and a small portion dried and stained with carbolic methylene-blue. By microscopical examination diplococci and short chains of small cocci were seen, but the authors are cautious about assuming that these are the specific germs of the disease.

Complications.—Blumenthal²¹_{No.17,'94} has made a complete examination of the urine in a series of cases of whooping-cough, finding it, without exception, to be of the following character: pale yellow, very acid, specific gravity 1022 to 1032; soon after being voided considerable uric acid was deposited, which, on quantitative examination, was found to be two or three times the normal amount, especially in young children. No albumin nor sugar was found. This group of characteristics appeared in the very first stages of the disease, increasing with the cough and lasting until the disease was over.

Zimmer¹⁹⁷_{Nov.20,'93} describes a case of hemiplegia occurring in the course of an attack of pertussis, probably due to a slight cerebral hæmorrhage, which was completely absorbed, as the child made a good recovery. A case of bronchiectasis after whooping-cough is reported by Abelman⁸⁵⁹_{No.45,'93}. Broncho-pneumonia is not a rare complication of this disease, but Bouloche¹¹⁸_{Oct.,'93} reports two cases complicated by pneumonia and pleurisy, with recovery in both. Winocouroff¹⁵⁸_{v.16, Nos.1,2,'93} relates a case of pneumothorax in a child of 4 years, following whooping-cough.

Koplik⁵¹_{Oct.,'93} read a very interesting paper on heart-strain in

pertussis before the American Pediatric Society, based on the study of fifty cases. Knight¹_{Sept.30,'94} also writes on the same subject, the authors having studied the cases together, and the results of their observations being the same. In many cases evidences of heart-strain are observed in the intervals as well as during the paroxysm, as evidenced by markedly rapid, irregular or dichrotic pulse; by cyanosis, great languor or malaise, and by dyspnoea.

Treatment.—Koplik⁵¹_{Oct.,'93} and Knight¹_{Sept.30,'94} advise the employment of antipyrin and digitalis to protect the patients from the deleterious effects of paroxysm on the heart and circulation. The antipyrin should be given in doses of 1 grain (0.065 gramme) for each year, the maximum dose being 5 grains (0.32 gramme). Digitalis, 1 minim (0.065 gramme) of the tincture for each year, the maximum dose being 4 minims (0.26 gramme).

Moncorvo⁵⁴²_{Oct.,'93} advocates the use of a 10-per-cent. solution of citric acid as a spray; although this does not, perhaps, equal resorcin, yet, when it is impossible to obtain the latter chemically pure, it can be used advantageously. Moreover, the author thinks that it may be of service as a prophylactic, administered as a concentrated lemonade.

Variot¹¹³⁹_{Apr.,'94} recommends the following formula:—

R Potass. bromidi,	.	.	.	2 drachms	(8 grammes).
Tinct. valeriani,	.	.	.	2 fluidrachms	(8 grammes).
Aque,	.	.	.	9½ fluidounces	(300 grammes).

M. Sig.: To an infant, 3 fluidrachms (12 grammes); to children of 2 to 5 years, 6 fluidrachms (23 grammes); to children of 5 to 10 years, 3 fluidounces (93 grammes). Daily.

One hour afterward syrup of turpentine, in the same doses, may be administered.

According to Unruh,³⁶⁶_{v.36,p.163,'93} the malady is to be considered as an infectious catarrh of the respiratory organs caused by a specific germ, leading to infection and swelling of the lymphatic glands of the respiratory tract, accompanied by and causing severe reflex symptoms, viz., the attacks; and for the relief of this condition he advises the insufflation of quinine, 8 or 10 grains (0.52 or 0.65 gramme) once a day, into the nose and pharynx, accompanied or not by the internal administration of quinine.

Baron¹¹³_{No.3,'94} has tried quinine in fifty cases with good result; in a few children beneficial effects were at once observed, especially on the second or third day, and not later than the fifth or sixth

day. On an average, three weeks were sufficient to effect a cure, and there were no relapses. The dose employed was $\frac{1}{5}$ grain (0.013 gramme) per month and $1\frac{1}{2}$ grains (0.1 gramme) per year of the child's age, three times daily. Forchheimer⁵¹_{Oct., '93} advocates the employment of quinine with belladonna.

Bromoform, first used in this disease by Stepp, in 1889, with great success, has an increasing number of advocates each year. Duncan,⁸¹⁴_{Dec., '93} while not regarding it as a specific, says that the failures are largely overbalanced by the successes. Pelicer⁶¹³_{Oct. 14, '93} believes that bromoform diminishes the frequency and number of the attacks and their duration. The dose is 1 drop for each year of the child's age, four times daily; and if, at the end of the third day, the paroxysms are not lessened, the dose should be gradually increased. Naphthalin-vapor inhalation has been tried by Koroleff in 9 cases,⁵³⁰_{No. 21, '93} with brilliant results in 4, the cough vanishing in three days; in the remaining 5 cases no results were obtained.

In order to test the question of the bacterial origin of whooping-cough, Raubitschek³_{Apr. 25, '94} treated several cases with a solution of corrosive sublimate, using a strength of 1 in 1000, applied to the tonsils, uvula, epiglottis, and adjacent membrane, either with a brush or a pledget of cotton-wool. Severe cases were treated daily, milder ones every other day. The condition was, as a rule, improved on the second or, at the latest, on the third day. A child treated at the onset of the convulsive stage would be well after four or five applications.

The hydrotherapeutic treatment of whooping-cough is recommended by Springer,³_{Nov. 1, '93} who reports the case of an infant of 1 year treated with cold mustard-baths, beginning with 38° C. (100.4° F.), every two hours, the water being steadily reduced in temperature so that on the third day it was as low as 18° C. (65° F.). When taken out the child was always wrapped in cotton-wool. He regards this treatment as indicated when the fever is high, the paroxysms frequent, and the child ceases to suck.

Naegely⁸²⁷_{No. 31, '93} describes an expedient for cutting short the paroxysms of whooping-cough and for the treatment of trigeminal neuralgia, hemicrania, globus hystericus, and nervous vomiting. It consists in seizing the two greater cornua of the hyoid bone with both thumbs and holding the bone, together with the larynx, up for sixty to ninety seconds. The author cannot explain the *modus*

operandi of the relief obtained, but is inclined to think that it calls an inhibitory reflex into play.

PAROTITIS.

Martin ⁹²_{Mar. 10, '94} reports an epidemic of mumps in which 48 men, out of a garrison of 450 to 500, were affected, and the origin of which could not be traced. The orchitis which occurred in 18 per cent. of the cases (in one case bilateral) the author looks upon as being the second degree of the poison rather than a complication. Otitis externa was present in one case.

Creswell ³²_{Apr., '94} reports one case of orchitis complicating parotitis.

Stubenrauch ²²⁶_{B. 47, II. 1, '94} reports a case of tubercular parotitis in an old man of 60. When the gland was excised microscopical examination of the contents showed the presence of the tubercle bacilli.

Chronic parotitis is a condition occasionally observed. Renault ³⁵_{Jan. 20, '94} relates the case of a woman, 41 years old, with a possible syphilitic history, who had had swollen parotid glands for four years; they were quite sensitive to the touch. Sometimes she discharged saliva in great quantities, and the secretion could always be made to flow by exercising slight pressure on the glands. Steno's duct remained patent and there seemed to be no calculi.

A case of chronic parotitis of six years' duration, reported by Sorel ²⁰³_{Mar. 15, '94} was cured by the extraction of a calculus from Steno's duct; and the author raises the question whether all cases of chronic parotitis do not depend on this cause. Czérny ¹¹⁸_{Aug. Sept., '94} cites a similar case, the duration of the trouble, however, only being about one month. There was swelling of the gland and pouting at the orifice of Steno's duct, and a slight discharge of pus. On the introduction of a sound a hard body was encountered at the distance of one centimetre. This was cut down upon, removed, and found to be a calculus two millimetres in diameter.

Treatment.—According to Martin, ⁹²_{Mar. 10, '94} buccal antiseptics diminishes the chances of testicular complications in parotitis. He employs a 4-per-cent. solution of boric acid (very hot), thymol, or carbolic acid as a gargle, and pilocarpine subcutaneously in doses of 0.01 gramme ($\frac{1}{6}$ grain) once daily, to diminish the pain and lower the temperature in cases of orchitis.

F. M. W.

SCARLET FEVER, MEASLES, VARICELLA, AND RÖTHELN.

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PHILADELPHIA.

SCARLET FEVER.

Etiology and Pathology.—Despite the progress of bacteriology, the pathogenic microbe of scarlet fever still remains undetermined, unless, in fact, the views enunciated by Bergé¹⁴_{Dec. 20, '93} should find acceptance. He states that it is useless any longer to search for a new microbe as the cause of this disease, and that scarlatina is primarily a local disease, with secondary infections (the eruption, etc.) due to the formation and absorption of toxins; the pathogenic agent is the streptococcus pyogenes,—the microbe of erysipelas, of puerperal septicæmia, etc. In common or tonsillar scarlatina the streptococcus finds a rich culture-field in the crypts of the tonsil, and there secretes (in all probability) “an erythematogenous toxin,” whose diffusion throughout the organism produces the cutaneous or mucous eruption.

Bergé remarks that the tonsillar affection takes precedence in order of time, and that, while the microscope invariably reveals the presence of the streptococcus in the tonsillar crypts, bacteriologists have never found microbes in the cutaneous exanthem, even by the recent methods of research formulated by Nicole.

Puerperal and traumatic scarlatina results from the local streptococcus-infection of the uterine (or other) wound, exception being made of morbid coincidences and of cases of tonsillar scarlatina which may be met with in the course of certain epidemics of puerperal fever, and are sufficiently explained by the existence of the common infectious agent,—the streptococcus. It is admitted, however, that there may be scarlatina without eruption, characterized exclusively by the angina.

The principal arguments on which this writer bases his conclusions may be summed up as follows: (1) the succession of the eruption to the tonsillitis in common scarlatina; (2) the fact that

careful observers have never found the tonsillar affection absent, even in certain rare cases where its presence was overlooked and denied (the so-called *scarlatina sine angina*); (3) the existence of a scarlet fever, really without amygdalitis, of uterine or traumatic origin; (4) the existence of a scarlatina without eruption, in which the streptococcus-tonsillitis and its complications constituted alone the disease; (5) the constancy of the streptococcus in the tonsils of scarlatinous patients; (6) the streptococcic nature of the complications of scarlatina; (7) the relations of scarlet fever to the puerperal infection; and, lastly, the ready demonstration of the "erythematogenous" property of the streptococcus (pyæmic eruptions, infectious erythema of bucco-pharyngeal origin, etc.).

These conclusions are also corroborated by the study of the clinical comparison between the acute amygdalitis (generally due to the streptococcus) and scarlatina (contagiousness, the same duration of the incubation, the same possible complications, similarity of the febrile cycle, the same symptomatology, save the eruptions, etc.). The diffusion of the infectious agent is no argument against the view advanced; we know only in part its modalities and its divers pathogenic actions. The non-recurrence of the disease can be affirmed only in respect to the eruption; the tonsillar affection may return again and again with the same violence.

An editorial ⁹⁹_{Jan. 13, '04} remarks that it can hardly be said that Bergé's theory, as stated above, explains anything more than the complications and sequelæ of scarlet fever, in connection with which a variety of common microbes, and in particular the streptococcus, have been found; it does not sufficiently explain the specific eruption, nor can it be said that this is identical with the erythema of puerperal infection. It will now be in order for Bergé to isolate the specific "erythematogenous" toxin and show that it is produced by some "modality" of the streptococcus; then his chain of evidence will be complete.

After an historical retrospect concerning the bacteria and protozoa found in scarlatina by Klein, Eddington, L. Pfeiffer, Frænkel and Freudenberg, Lenhartz, Raskin, and others, Johannes Boehm ⁹³⁰_{Apr. 15, '04} reviews "The Bacteriological Researches on Septic Processes in Children," as far as they are germane to the subject under consideration. Babes considered the streptococcus as the primary pathogenic factor in the etiology of scarlatina, in-

fluenced chiefly by the constant presence of the streptococcus, in thirteen recent cases of glomerulo-nephritis. Proof was obtained in some of the cases by the culture method alone, and, far less frequently, by microscopical researches. Boehm had a case of scarlatina in which the patient died in convulsions at the end of forty-eight hours. A protocol of the sickness and autopsy is given. Stroke cultures on glycerin-agar were made from the kidneys, the lymphatic glands of the neck, the tonsils, and the skin, and portions of the same organs were placed in alcohol for histological study. The streptococci were obtained by histological and culture methods in the tonsils only. Boehm considers the streptococcus found in the internal organs in scarlatina as a secondary infection (probably from the tonsil). That the nephritis also belongs to this secondary infection is not shown, in spite of the constant appearance of the streptococcus in the cases observed by Babes. The characteristic tissue-changes in scarlatinal nephritis do not develop hand-in-hand with an advancing growth of penetrating streptococci in the kidney. Babes has not noted any particular pathogenic organism that could be found constantly in relation to the scarlatinal process. The histological changes in the internal organs could be considered as merely those of cloudy swelling.

Ricochon, of Chambéry, ⁵⁹_{Feb. 3, '94} reports some observations which he considers presumptive evidence in favor of the identity of the poison in scarlatina, suppurative lymphangitis, erysipelas, and suppurative adenitis.

André Martin ³¹_{Sept. 1, '94} reports a case (see *Complications*) which would seem to show that streptococcic infection may be the common cause of scarlet fever and erysipelas, but we must bear in mind that the presence of mixed infection in the same individual may be nearer the truth.

Washbourn has been engaged in an experimental investigation of the nature of scarlet fever, and reports ²_{July 23, '94} that in cases of scarlet fever the exudation on the throat and the pus from various sources have been examined microscopically and by cultivation. The pus from glandular abscesses and from abscesses in the joints and subcutaneous tissue has been examined, and in all cases a streptococcus has been found, in pure cultivations, which appears to be identical with the streptococcus pyogenes.

Frank R. Blaxall, of London, ²_{July 21, '94} from bacteriological ex-

aminations of the suppurative ear-discharge occurring as a complication in scarlet fever, concludes (1) that the organism most potent in the etiology of the otitis media of scarlet fever is the streptococcus pyogenes; (2) that the less chance there is of contamination from the outer air through the external orifice, the more the pyogenic cocci predominate over the rod forms, but that prior to perforation of the membrane the occurrence of such organisms is not excluded, since they may ascend from the mouth and air-passages; (3) that next to the streptococcus the most important organisms are the staphylococci albus and aureus; (4) that apparently the diplococcus pneumoniae of Fränkel or the bacillus pneumoniae of Friedländer does not play an important part in the otitis media of scarlet fever as in that due to other causes. Adolf Baginsky and Stamm, of Stuttgart, ¹⁵⁸_{II.6,'93} describe the lesions of the kidney in scarlatinal nephritis, with illustrative cases.

W. Dowson, of Bristol, Eng., ²_{Nov.25,'93} contends that in scarlet fever the primary lesion is in the tonsil, and that it is, in its commencement and throughout, a local disease of these parts and associated lymphatic glands, the general symptoms being caused by the absorption of toxins produced by the microbic growth at the seat of the local lesion.

R. C. Atkinson, of St. Louis, ⁶⁶³_{Mar.'94} cites a case in this connection. The patient had no tonsils, since they had been destroyed in treating him for mycosis by galvano-cautery some six months before. He incidentally remarks that he has treated cases of scarlatina abundantly marked with the exanthem, which manifested the most trifling sore throat, and other cases in which the pharyngitis has, prior to the third day of the disease, been nothing more than a discoloration of the mucosa.

Epidemics due to infected milk are reported by George Carpenter, of London ⁵¹_{Apr., '94}; Searlyn Wilson, of Hastings ⁶_{Apr.21,'94}; and Shirley Murphy, of London. ⁶_{Aug.25,'94} In Wilson's report the cows were suffering from fever, but there were no signs of any eruption on the udders or teats, and no falling off of hair, etc., as have been generally noted in reports heretofore submitted.

David D. Spear, of Freeport, Me., ⁹⁹_{Dec.14,'93} reports an epidemic which seemed to show that the contagion of scarlet fever can be kept alive for a long space of time (nineteen years). Lyman B. Todd, of Lexington, Ky., ²²⁴_{June 2,'94} reports one case occurring in a

house, vacant for six months, which had been carefully cleansed and aired before occupancy. Fourteen months previous to this attack a child had died in that house of scarlet fever. He reports another case where the source of the contagion was traced to an infected picture-book that had been packed away in a trunk for twenty-six years.

Incubation.—Although authors are quite agreed that the usual period of incubation is from two to eight days, considerable doubt is felt as to the existence of one longer than eight days. This is, however, a most important point, for it intimately concerns the question of the duration of quarantine. In a series of cases reported by George Carpenter, of London, ⁵¹Mar., '94 the patients originally attacked were at once isolated and transferred to the infectious hospital some miles away, disinfection being successfully carried out by the authorities, for no further cases occurred. On dismissal to their homes of cases pronounced cured, their return was signalized by an outbreak of fresh cases in these houses. There is no resident medical officer at the hospital, this medical superintendent being in general practice and residing some two miles away. The matron is not a trained nurse, and acts in the capacity of cook to the institution. The nursing arrangements are meagre, and undertaken by "raw" hands. The bathing accommodations are inadequate. The consequence is that, in the district which this hospital serves, fresh cases arise on the return of discharged patients to their homes. The author reports 11 original cases which, after a stay at the hospital of from forty-six to eighty days (average 60 days), were discharged, although in 10 cases desquamation had not ceased, and on returning to their homes infected 20 other cases. Of the 20 cases attacked, 9 only were within a period of eight days. In 2 cases the incubation period was eighteen and twenty-one days; in 3 cases the times were nine, twenty, and twenty-one days; in 3 cases, two, five, and thirteen days; in 4 cases, five, seven, fourteen, and fourteen days; in 2 cases, nine and eighteen days.

Symptomatology.—J. R. Spiers, of Montreal, ²⁸²Apr., '94 gives a synopsis of 100 cases treated at the Montreal General Hospital. In over 50 per cent. of the mild and moderate cases, convalescence set in on the fourth or fifth day by crisis, the temperature falling in a few hours 2° to 3° F. (3.6° to 5.4° C.); then by lysis, reach-

ing normal by the end of a week or ten days. In a few cases the temperature fell to normal in twenty-four hours. The remainder of the cases reached the normal by a gradual lysis in from five to ten days. The rash, in many cases, presented peculiar appearances. In many of the mild cases it was apparently absent or very transient, or appeared only in certain parts of the body, chiefly on the neck and chest, in the form of erythema. In 3 cases minute red spots, without a general redness, appeared. In the moderately-severe cases the rash, as a rule, presented the appearances generally described, but 2 or 3 presented a distinctly-papular rash, these papules being especially distinct on the back of the hands and forearms. Among the severe cases anomalous rashes were common. One case presented a papular, hæmorrhagic rash over the whole body, without any distinct coloration of the skin between. Two or three cases had very numerous small vesicles over the whole body. The case of a young child presented the appearance of an acute exfoliative dermatitis. The throat in mild cases showed, as a rule, redness and some slight swelling of the soft palate and tonsils. In the severe cases the whole palate, pharynx, and tonsils were intensely red and covered with sticky mucus. In the most severe cases ulceration and destruction of the tissues occurred, accompanied by a fetid odor. In these cases, also, the glands of the neck became swollen and inflamed, frequently running on to suppuration. A general pyæmia had been frequently set up. In one case sloughing of the tonsils and cellular tissue of the pharynx occurred, leaving the muscles of the pharynx clearly dissected out. In another case an abscess developed behind the soft palate, which was evacuated by an opening through it, with immediate relief. A large number (8 per cent.) presented a diphtheritic appearance. This was most common in the very severe cases. They were always accompanied by enlargement of the glands of the neck, which occasionally went on to suppuration. The digestive system was not, as a rule, much disturbed, except that the appetite was lost. Vomiting was persistent for four or five days in 4 cases. Diarrhœa was troublesome in 3 cases early in the disease. In fatal cases it frequently set in during the last three or four days.

Complications and Sequelæ.—Caiger, ⁶_{MAY 6, '94} at a meeting of the Epidemiological Society of London, presented a study on the co-

existence or close succession of two or more infectious diseases in the same individual. His experience at Stockwell had satisfied him that such concurrence of infections was as frequent as mere probabilities would explain, and that, so far from affording protection against other diseases, some certainly increased the susceptibility thereto. In the last four years he had seen 362 cases of two and 17 of three diseases running some parts of their course concurrently; in 200 of these the acute febrile stages of two or three coincided. The priority of the diseases was calculated from their known incubation periods. The primary disease was scarlatina in 197, which was complicated by diphtheria in 97 cases, varicella in 43, measles in 31, pertussis in 13, erysipelas in 10, enteric fever in 2, and typhus in 1. Scarlatina was a complication in no fewer than 88 among 97, in which the primary disease was diphtheria; in 20 among 23 of varicella; in 14 of 17 of pertussis; in 6 of 9 of enteric fever, and 9 of 18 of measles, though here diphtheria accounted for another 7. Among the triple attacks, scarlatina was the primary disease in 9 and a complication in 4 only, diphtheria holding the highest place with 9. During the past six years 48,376 cases of scarlatina were admitted into the hospitals of the Asylums Board; of these, 3166, or 6.54 per cent., were complicated,—1094 with diphtheria, 899 with varicella, 703 with measles, and 404 with pertussis. The conclusions at which he arrived, after eliminating the influence of age incidence, seasonal prevalence, actual frequency, etc., were that there was no such thing as antagonism between any, but rather the reverse, increased susceptibility being brought about, generally or locally; that is, first, by the lessened power of resistance induced by a disease attended with grave constitutional disturbance, and, secondly, by the local inflammations facilitating the development of the contagia of diseases known to affect the mucous membranes or tissues in question.

Edward Carmichael, of Craiglockhart, ⁶_{May 19, '94} and Gustavus G. Gidley, of Cullompton, ⁶_{June 23, '94} each report 1 case of co-existing scarlet fever and enteric fever; S. A. E. Griffiths, of Irthlingborough, ⁶_{Nov. 25, '93} reports 4 similar cases in one family. Coulon ⁹⁴⁶_{Mar. 25, '94} reports 2 cases of concurrent scarlet fever and varicella; B. S. Talmey, of New York, ¹_{Feb. 2, '94} 1 case. André Martin ³¹_{Sept. 1, '94} notes a case of recurrent erysipelas where scarlet fever was developed between

the second and third attacks of erysipelas (*érysipèle à répétition*). Louis Wolberg, of Warsaw, ¹⁵⁸_{B.17, H.5,6} publishes a second case of concurrent scarlet fever and variola, the first having been under his care nine years previously. ⁴_{No.37,'82} Coulon ⁹⁹⁶_{Mar.25,'94} notes a case in which excessive itching marked the onset; several hours after the scarlatinal rash had appeared an urticarial eruption developed and persisted for twenty-four hours.

In a synopsis of the first 100 cases treated at the Montreal General Hospital J. R. Spiers ²⁸²_{Apr., '94} notes the following complications: cervical adenitis, 19; acute nephritis, 8; otitis media, 6; diphtheria, 4; arthritis, 3; mitral disease, 2; pneumonia, 1; relapse, 1.

P.-A. Lop, of Marseilles, ¹⁰⁰_{July 5,'94} reports a case of hyperthermic scarlatina with death in sixty hours. The temperature, when first taken, was 41.8° C. (107.25° F.); before death it reached 44° C. (111.20° F.).

J. W. Washbourn and E. W. Goodall, of London, ²_{Jan.25,'94} find, from bacteriological examinations, that a membranous inflammation of the throat occurring during the acute stage of scarlet fever is not generally true diphtheria, but a similar condition occurring during convalescence is true diphtheria. These conclusions, the authors state, are in accord with the bacteriological examinations made by Klein and others. In a case observed by them the membrane was remarkably tough and thick, but no diphtheria bacilli were found. The membrane, in these cases, does not spread to the larynx, and does not recur, after it has once disappeared, as in true diphtheria.

Edmond Deffernez, of Jumet, ⁵²_{Oct.28,'93} gives identical conclusions, as a result of extended observation and experiment.

E. H. Williams, of Decorah, Iowa, ⁸¹⁴_{Nov., '93} reports a peculiar desquamation which followed a case of scarlet fever. At the end of two weeks, desquamation being completed, the patient went to work. A few days after this a second desquamation began and was completed about the end of the fourth week. Immediately following this, a third and very remarkable desquamation was noticed. Instead of the ordinary form, the epidermis seemed to peel off entirely, leaving the true skin exposed. On this surface thick crusts then formed, being sometimes 2 to 3 inches (5 to 7.5 centimetres) in diameter, $\frac{1}{8}$ inch (0.3 centimetre) in thickness,

and of a dark-brown color. These would remain forty-eight to sixty hours, when they would fall or be brushed off, leaving the bleeding papillæ exposed. Fresh crusts would again form. The entire surface of the body was involved, especially over the flexor portions. The face, lips, and eyelids were almost a solid crust, the ears alone escaping. At the end of the second week of this profuse desquamation the process invaded the deeper tissues and large ulcers formed. Two weeks later the patient died. A careful inquiry revealed what was probably a syphilitic trouble existing in two previous generations.

Aufrecht¹³_{Apr., '94} notes three cases of septic interstitial scarlatinal nephritis. T. J. Tonkin⁶_{Dec. 2, '93} reports a case of uræmia following scarlet fever, the points of interest in which seem to be the number and regularity of the fits (twenty-eight in fourteen hours) and the recovery of the patient. G. F. Messer, of Waupun, Wis.,⁷²_{Apr., '94} mentions a case of interest in that three complications were present,—nephritis, adenitis, and choreic manifestations.

Anomalous Cases.—B. Langran, of Liverpool,⁶_{Feb. 10, '94} reports a case of scarlet fever which was followed by death in less than twenty-four hours after the appearance of the rash; the temperature about twenty minutes after death was 108.2° F. (42.3° C.). E. Hache⁵⁷⁷_{June, '94} observed a sudden rise of temperature (40° C.—104° F.) on the eighteenth day of the disease, which persisted for forty-eight hours. There were no complications. E. Wearne Clarke¹_{May 12, '94} relates a similar case. He is inclined to think with Bouveret, that in such cases the continuance of fever is due to the action of a toxin of scarlatinal origin, very probably producing a disturbance of the nervous centres.

Secondary Attacks.—A number of cases have been reported during the last year in which patients have had a second attack of scarlet fever, after periods varying from a few days to several months. Duncan J. Caddy⁶_{Nov. 25, '93} reports 3 cases; Maurice J. Doidge²_{Dec. 16, '93} and Jos. Vollmer⁸¹⁴_{Aug. 1, '94} each report 2 cases; H. P. Johnson,²_{Dec. 16, '93} Wm. J. T. Barker,²_{Oct. 14, '93} Charles P. Childe,²_{Nov. 11, '93} Henry L. G. Leask,²_{Feb. 3, '93} and Hecht¹⁸⁴_{Apr. 1, '94} each report 1 case.

Diagnosis.—The differentiation of scarlet fever from röteln in well-marked cases is easy, but in atypical and mild cases there is great danger of error. F. P. Atkinson, of Surbiton,⁶_{Oct. 21, '93} groups the salient points of difference as follows:—

SCARLET FEVER.

1. Patient feels ill.
2. Initial fever lasts one week, at least.
3. Period of incubation, as a rule, from 24 to 72 hours.
4. Submaxillary glands, as a rule, enlarged.
5. Tongue strawberry-looking, with red papillæ showing through the fur.

RÖTHELN.

1. Patient scarcely feels ill at all.
2. Initial fever lasts 3 or 4 days.
3. Period of incubation, most commonly about 18 days.
4. Glandulæ concatenatæ, as a rule, enlarged, but not the submaxillary.
5. Tongue almost natural.

The author adds that the rash and peeling cannot be considered as diagnostic points.

Crocker ⁶_{Nov.25,'93} considers one week the shortest initial fever period in scarlet fever. Henry E. Bridgman, of Burton-on-Trent, ⁶_{Apr.21,'94} fails to find any points of difference between the enlargement of the lymphatics in scarlet fever and rötheln; he has observed that children suffering from rötheln, early in the case, frequently complain of pain in the neck and draw attention to the hard, pea-like glands; whereas, in scarlet fever, he does not remember to have heard a child complain, early in a case, of suffering pain or inconvenience from these enlarged lymphatics. After careful observation, he has long been convinced that the cervical glands, especially those lying behind the mastoid, are as constantly enlarged in the early stage of mild scarlet fever as in rötheln. Clement Dukes ⁶_{Mar.31,'94} has tabulated the distinguishing characteristics of scarlet fever and rötheln in a form convenient for ready reference.

Henry Ashby, of Manchester, ⁹⁰_{June,'94} remarks that the rash may be exactly alike in the two diseases (he gives cases), and the slight desquamation which follows exactly similar. Certainly, also, in many cases of rötheln there is no enlargement or tenderness of the cervical or other lymphatic glands, and, on the other hand, in out-patients especially, enlarged glands altogether unconnected with any zymotic disease may be present. In rötheln there may also be sore throat exactly similar to the tonsillitis of scarlet fever, and in the latter disease there may be no cleaning of the tongue, giving it the well-known "strawberry" appearance. In many cases, he states, there is nothing for it but to suspend our judgment and to isolate or treat the cases as if they were scarlet fever.

C. W. Suckling, of Birmingham, ²_{June 2,'94} has remarked the occurrence of a bright, scarlet rash after injections of warm water into the bowel. The rash appears in about two hours after the injection and lasts about twenty-four hours. It covers the whole

of the body and limbs and is especially marked on the face. In rare cases it is accompanied with sore throat and slight fever. The rash is almost exactly like that of scarlet fever, and may be easily diagnosed as such, especially if a sore throat be also present. It occurs more commonly in children than in adults, and is occasionally distinctly urticarial. It is due to toxæmia caused by absorption of fecal matter liquefied by the injection of a large quantity of warm fluid into the rectum. Staveland ^{June 30, '94} points to a similar skin-condition met with after the use of brisk aperients in chronic constipation, and also in the later stages of acute intestinal catarrh when peristalsis of the paralyzed gut is established. In all these cases he has found that indican is present in the urine. David Walsh ^{July 7, '94} remarks that a kindred phenomenon may be found in the scarlet rash, at first minutely punctate and then diffuse, which sometimes follows the subcutaneous injection of Koch's tuberculin.

Prophylaxis.—Henry Ashby, of Manchester, ^{June, '94} urges the importance of rigidly isolating every case in which there is a red, punctiform, diffuse rash, and treating it as if it were scarlatina, unless it can be satisfactorily proved that it is not. Lyman B. Todd, of Lexington, Ky., ^{June 2, '94} submits the following rules as conforming to the latest-approved methods of disinfection: (1) all fabrics which will not be injured in the process must be boiled in water for at least four hours; (2) fabrics which will not stand this treatment are to be subjected to the action of dry heat for a much longer time; (3) furniture, etc., may be treated with $\frac{1}{4}$ -per-cent. solution of carbolic acid; (4) all articles which have been in actual use by the patient must be burned; (5) the walls of the room must be thoroughly rubbed down with bread, which must afterward be burned; (6) the sputa and excrements of the patient must be at once treated with chloride of lime.

A. Konen ^{996 Aug. 25, '94} and William Gibson ^{15 July, '94} advocate the use of warm baths during desquamation. The latter gives, after the end of the second or third week, a succession of three or four comfortably-warm baths, sometimes daily, at other times on alternate days, using carbolic-acid soap freely, and washing the patient most thoroughly from top to toe. After each bath, except the last, the patient is put back in the bed on which he has lain with the disease; after the last, he is taken from the bath into a clean room, is dressed with clothes free from infection, and then allowed to

mix with the rest of the family. Any patient with a complication such as otitis or ulcerated or suppurating throat is not subjected to the process.

J. Comby ³¹_{Aug. 25, '94} remarks that the prophylaxis of scarlet fever may be summed up in two words,—*isolation* and *antisepsis*. He advises that all persons should slip on a linen gown before entering the sick-room and remove the same after leaving it. The children of the family, if exposed at all to the contagion, should be considered as suspects, placed in quarantine, and excluded from school, as rigidly in doubtful cases as in severe ones. Thorough disinfection of the patient by baths, antiseptic inunctions, and careful washing of the throat, nares, hair, etc., is enjoined. A 5-per-cent. solution of copper sulphate for disinfecting the dejections, sputa, etc., is advised by the author and by E. Périer. ²⁴_{May 13, '94} Both give minute directions concerning, and insist upon the importance of, the disinfection of the patient, the attendants, and the apartments.

Albert S. Ashmead, of New York, ¹¹²_{Oct., '93} has conferred apparent immunity upon persons not sick with, but exposed to, scarlatina, through the inoculation of pure blood-serum (10 to 15 minims—0.66 to 1.0 cubic centimetre) obtained from a blister raised upon the skin of a child who had had scarlet fever.

Treatment.—In every case of scarlet fever, says Clement Dukes, ⁶_{Mar. 31, '94} it requires twenty-one days of lying in bed absolutely. The patient should be clothed in a flannel night-shirt, and the skin daily greased with carbolized or eucalyptus-oil. No food should be given for the first week, except milk and farinaceous foods, however slight the illness, to guard against nephritis. The patient should be isolated for six or eight weeks, but Dukes does not think it essential to prolong isolation until all desquamation has ceased *from the hands and feet*, for this process sometimes occupies several additional weeks.

J. Comby, ³¹_{Aug. 25, '94} in speaking of general or hygienic treatment, advises a large, well-ventilated room, or, better, two communicating rooms. The temperature of the apartment should be kept between 18° to 20° C. (64° to 68° F.), and the air moistened by means of a 3-per-cent. boric-acid or $\frac{1}{2}$ -per-cent. carbolic-acid spray, or by steam from boiling water. Light bed-coverings should be used during the febrile stage, and thick, warm ones during desquamation and conva-

lescence. Alimentation during the febrile period should be restricted to beef-tea and warm milk, by preference the latter. Acidulated drinks, however, may be used freely, as well as warm drinks. Even after the fever has declined, milk diet must be continued for five or six weeks. All alcoholic drinks should be forbidden. As soon as the diagnosis is made, the patient should have a bath at a temperature of 30° to 32° C. (86° to 90° F.) for fifteen or twenty minutes, the body being thoroughly rubbed with soap. Later, tepid baths give great relief. During desquamation an ointment of tartaric acid and vaselin (2 per cent.) favors the removal of the epithelial scales and the impurities of the skin. Borated vaselin (10 per cent.) or carbolated vaselin (1 per cent.) may be used instead. Antisepsis of the mouth, throat, nose, and vulva is important. Irrigations, three or four times daily, may be made with a boric-acid solution (3 per cent.); in young children, sprays of the same may be substituted, or the parts dressed with tampons of absorbent cotton saturated with borated glycerin or borated vaselin, and renewed three or four times daily, or a few drops of borated vaselin-oil may be instilled into the nasal cavities. The vulva should be washed with borated solutions. In short, milk diet, confinement to bed, and antisepsis of the throat are the indications. The patient should remain three weeks in bed and at least six weeks in his room. Of the antipyretics, Comby gives preference to quinine, given in capsule, coffee, with licorice, or, preferably, in suppository. To a child of 5 years he gives every evening the following suppository: quinine sulph., 0.15 gramme (2 grains); cocoa-butter, 2 grammes (30 grains). Next in favor the author mentions antipyrin, 0.5 to 2.0 grammes (8 to 30 grains) being given daily in divided doses.

The salicylates are not employed unless the urine be carefully examined, morning and evening, to detect any untoward effect of the remedy upon the kidneys. Acetate-of-ammonia solution—1 gramme (15 minims) for each year of the patient's age, given from the beginning of the sickness—has a lowering effect on the temperature. Digitalis, in small doses, 0.05 to 0.10 gramme ($\frac{3}{4}$ to $1\frac{1}{2}$ grains) of the powder, in infusion, produces a similar effect. Cold baths at 22° to 25° C. (71° to 77° F.) are highly commended, unless contra-indicated by asphyxia or a tendency to collapse; tepid baths are then preferable. A tendency to collapse is an

indication for heart-tonics (digitalis, caffeine), diffusible stimulants, inhalations of oxygen (for fifteen minutes every half-hour or hour), and stimulating frictions with spirits of camphor. Bromides, chloral, musk, and chloroform may be required for jactitation, delirium, or ataxia, used in connection with the cold baths. Imperfect development of the eruption, with cerebral symptoms, is an indication for frictions with spirits of camphor, the use of baths, or mustard. When the eruption is livid and the extremities are cold, warm affusions with water at 40° C. (104° F.) or a warm bath may be given. The most frequent and important complication of scarlet fever is nephritis, its well-known symptoms being albuminuria, anasarca, and sometimes uræmic convulsions. The presence of albuminuria demands a strict milk diet and the avoidance of alcoholic drinks. In addition, the skin should be excited to vigorous action by means of warm baths, hot-air or steam baths, or by hypodermatic injections of pilocarpine-nitrate solution (1 or 2 per cent.), using 0.5 to 1 gramme (8 to 15 minims) of the solution. Dry or wet cups should be applied to the lumbar region, and warm, diuretic infusions (infusion of broom-tops, 3 parts in 150; acetate of potash, 1 to 3 parts) given. Purgatives, as jalap and scammony, in doses of 0.20 to 0.50 gramme (3 to 7½ grains), are also indicated. To control the nephritis, astringents are highly recommended, especially tannin. V. Massini's formula is: Tannin, 0.15 gramme (2¼ grains), with sugar, 0.30 gramme (4½ grains), for one dose, which is given two to four times daily. Roger gives it as follows: Gum-julep, 100 grammes (3½ ounces); tannic acid, 0.20 gramme (3 grains); tinct. of aconite, 10 drops. Mix and give a dessertspoonful every two hours. Demme exhibits diuretin in scarlatinal anasarca, giving 0.50 to 1.50 grammes (7½ to 22 grains) to a child of 2 to 5 years, or 1.50 to 3 grammes (22 to 45 grains) to a child of 6 to 10 years. His formula is: Diuretin, 1.50 grammes (22 grains); sugar, 2.50 grammes (38 grains); cognac, 10 drops; water, 100 grammes (3½ ounces). Mix and give a teaspoonful every hour. Finally, if there be uræmic symptoms (headache, vomiting, dimness of vision) or eclamptic seizures, give a purgative enema, apply one or two leeches behind the ear, or, if necessary, bleed from the arm in adults and older children. Then place an ice-bag upon the head, give inhalations of chloroform, and give chloral by mouth or rectum,—chloral, 1 gramme (15

grains); warm milk, 60 grammes (2 ounces). Mix and inject into the rectum, repeating if necessary.

The hæmorrhagic complications of scarlet fever (petechiæ, hæmaturia, hæmoptysis) are best treated by ergot or ergotin, perchloride of iron, rhatany, citric and tartaric acids, etc. A dessert-spoonful every hour may be given of the following: Aq. ext. of ergot, 1 part; syr. orange-flowers, 20 parts; water, 80 parts. Mix. Or of the following: Gallic acid, 1 part; mint-syrup, 30 parts; water, 70 parts. Mix and use as the preceding. The acids are given in the form of lemonades, and if hæmaturia be present intestinal antiseptics is brought about by the use of the following: Benzo-naphthol, 0.20 gramme (3 grains); calcined magnesia, 0.25 gramme (4 grains); pulv. sugar, 0.50 gramme ($7\frac{1}{2}$ grains). Mix and make one dose, to be repeated every two hours.

When scarlet fever is complicated with grave angina (diphtheritic, gangrenous, phlegmonous, etc.), antiseptics are to be applied to the fauces. Ice may be swallowed. Applications of lemon-juice, borate of soda, carbolized glycerin (1 to 30), phenol, naphthol-camphor, etc., may be used in connection with copious irrigations of salicylic-acid solution (1 or 2 per mille), of carbolized water (1 per cent.), or of boric-acid solution (3 per cent.). The patient's tongue should be depressed and the stream directed toward the deeper parts of the throat. In very young or intractable children the throat may be sprayed with an antiseptic solution and the following given internally: Soda chlorate or benzoate, 2 grammes (30 grains); mulberry-syrup, 30 grammes (1 ounce); water, 60 grammes (2 ounces). Mix. Abscesses and other purulent collections consequent upon the angina should be opened, and antiseptic irrigations employed when otorrhœa is present.

For the itching, the prurigo, or the urticaria, which may be present in the beginning, during the course, or at the end of the eruptive period, fatty unguents or an acid ointment may be used. The patient may be anointed three or four times daily with the following: Lanolin, 50 parts; vaselin, 20 parts; distilled water, 25 parts. Mix. Or the following may be used: Vaseline, 40 grammes (10 drachms); essence of mint, 2 drops; tartaric acid, 1 gramme (15 grains). Mix.

Albert S. Ashmead, of New York, ¹¹²_{Oct., '93} has used, as a curative measure in patients having scarlatina, injections of pure

blood-serum, taken from a blister raised upon the skin of a child who had scarlet fever five years before. Thirty minims (2 grammes) were injected into the patient's forearm. The following points, noted by Ashmead, are of interest from a clinical point of view: A quick fall of temperature following the first insertion of immunized blood-serum, its continuance at about 100° F. (37.77° C.), an early commencement of the desquamative stage, its commencement at the points of inoculation, and its early complete ending. Ashmead states that the application of a blister over the kidneys in scarlatinal nephritis is followed by a good effect, and notes that the earliest symptom of improvement in this complication is the appearance of urates and uric-acid crystals in the urine.

In cases where abscesses form and also in phlegmonous tumors of the neck, Th. Gluck ¹⁵⁸_{1f.6,'93} advises early and radical surgical interference. The presence of scarlet fever, he holds, does not contra-indicate any necessary surgical operation, provided antiseptics is fully carried out. Iodoform, sublimate, and carbolic acid are his favorite antiseptics.

William H. Flint, of New York, ¹_{Jan.6,'94} notes that the most rational method of combating the predisposing causes of scarlatinal nephritis and of guarding, so far as possible, against its attacks, consists in augmenting the watery constituents of the urine *at the same time* that the cutaneous and intestinal secretions are held at their normal quantitative standard, not only during the febrile period, but also after the fever has subsided and the appetite craves solid foods. He advises a faithful adherence to strict milk diet and a careful observation of all other prophylactic precautions for a month after the cessation of the fever.

Frank E. Peckham, of Providence, ⁹⁹_{May 24} reports that the inunction of guaiacol (15 to 20 drops) is efficient in reducing high temperatures in scarlet fever.

MEASLES.

Incubation.—M. R. J. Behrendt, of Scunthorpe, Eng., ²_{Dec.23,'93} reports an interesting case in this connection. His son returned home, November 20, from school, ill with measles, the rash being very apparent on his face. On November 29th several of the remaining seven children began to ail with the symptoms of cold,

headache, and lassitude. Next day all were complaining, and on December 1st all the seven were too ill to get up from bed, and all had the rash appearing on their faces. On December 2d the rash was well developed on the face and appeared on the trunk in each case. The period of incubation from the first receipt of infection was, therefore, eleven days. There were no other cases of measles in the vicinity, and had not been for two or three years.

Anomalies, Complications, and Sequelæ.—Ch. Fiessinger, of Oyonnax, ⁵⁵_{May 12, '94} gives his conclusions, based on a long experience with this disease. Contagion, he incidentally remarks, is generally manifested during the period of invasion, and has been direct in all his cases except one. He does not believe in Grissol's assertion that dentition aggravates the prognosis of measles. In three-quarters of his cases the eruption had appeared on the third, fourth, or fifth day; but it had sometimes been delayed until the sixth or seventh, and more rarely until the eighth or ninth. On the other hand, it is sometimes precocious: in a child convalescent from endemic influenza it appeared on the first day. He has seen the rash develop on the body before attacking the face, and in four cases observed urticaria. This urticarial eruption generally precedes the morbillous rash, and rapidly disappears before the exanthem develops. The urticarial eruption does not, as a rule, itch very much, and ordinarily the temperature is not affected. In two cases only, when the exanthem appeared, the fever declined and the temperature became normal. Hæmorrhages are frequent during the course of the disease, and, besides epistaxis, Fiessinger has observed hæmoptysis and hæmatemesis; also hæmorrhage from the right ear. Bronchitis often prolongs measles; there are moist râles localized at the base and back of the lungs, accompanied by more or less dyspnœa; diarrhœa sets in with the bronchitis, and fever persists until the temperature has risen to 39° C. (102.2° F.). The stethoscopical signs of morbillous capillary bronchitis often fail to be detected, or, indeed, may be absent. Two causes will explain the absence of stethoscopical signs: 1. The lesions are so slight in extent or so profound that they present themselves under the form of disseminated foci; or are separated from the thoracic wall, by a considerable thickness of normal pulmonary tissue, so that they are not accessible to the finger or ear. 2. The bronchial lesions are

really very limited, and autopsy shows that the dyspnœa and elevation of temperature observed during life cannot be reasonably attributed to them. Death from capillary bronchitis or broncho-pneumonia is not always rapid; it may not take place for several weeks. The author has seldom seen these two complications at the beginning of an epidemic or in sparsely-settled villages. The latter (broncho-pneumonia) is contagious, as has been shown by Bard. (See ANNUAL, 1890, vol. i, 1-20.)

Sometimes death seems less due to pulmonary lesions than to the intensity of digestive troubles. Diarrhœa may induce a rapid prostration, causing death before the eruption has had time to appear. In some cases, in the apparent absence of bronchial or digestive complications, death is sudden and can be explained only by the intensity of the disease.

Tracheo-bronchial adenopathy and tuberculous meningitis are the most serious and most frequent complications. Death from the former may occur several weeks or months after recovery from measles. Pertussis-like cough sets in, with hoarseness from compression of the recurrent nerve; severe dyspnœa, accompanied by spasmodic inspirations, sometimes causes facial cyanosis. Dullness is present in front, over the upper part of the sternum. The subcutaneous veins of the antero-superior region of the thorax are much dilated; emaciation is rapid, anorexia is complete, and œdema of the face occurs just before death.

Tuberculous meningitis is a frequent complication, and in a year following an epidemic of measles, where this complication sets in, the number of cases is four or five times as great as in an ordinary year. Tuberculosis also invades the other tissues. Pott's disease, otitis, kerato-conjunctivitis, and ulcers of the cornea not infrequently follow measles. Infantile paralysis and acute nephritis, two rare complications, have been observed by Fiessinger. Recurrence of the disease was seen in a little girl who was taken sick a day or two after recovery from the first attack.

E. P. Bernardy, of Philadelphia, ²³_{July, '94} observed pertussis as a complication of measles 21 times in 166 cases. In these cases belladonna, pushed to its physiological effects, acted well; when this failed, which it often did, ammonium picrate was employed with success in almost every case. Bromoform was tried, but abandoned as unsafe and useless.

Claus, of Dresden, ³⁶⁶_{June 5, '94} notes 2 cases of urticaria during the incubative stage. Of 270 cases of measles, croup was present in 17 cases, and in 3 cases diphtheria.

H. Audeoud and M. Jaccard, of Geneva, ¹⁹⁷_{Jan. 20, '94} report 6 cases of croup with alarming stenosis, 2 cases of dyspnoea of pulmonary origin, 1 case of broncho-pneumonia with pyothorax, 3 cases of acute delirium during convalescence from measles (all three in adults), and 1 case of polyuria with retention of urine for twenty-two days (without paraplegia), all as complications of measles.

P.-A. Lop ³¹⁹_{No. 50, '93} states that the paralysis due to measles is not as rare as is commonly believed. He has reported 2 cases. Two forms are noted,—the spinal and cerebral. The prognosis of the former is not grave, but in the latter prognosis should be guarded, as the aphasia is very slow to disappear.

Bonamy, of Nantes, ¹²⁷_{Mar. 12, '94} and J. C. Wilson, of Philadelphia, ¹_{Aug. 4, '94} report one case each of hæmorrhagic measles. Varnali, of Bucharest, ¹¹⁸_{May, '94} reports a case of measles in which subcutaneous emphysema was present; appearing suddenly, on the fourth day, after a paroxysm of coughing, followed by vomiting. Mensi, of Turin, ⁹⁹⁶_{July 10, '94} reports 3 cases of cutaneous gangrene occurring with measles, and James Hudson, of Nelson, Eng., ⁵⁵⁷_{Jan., '94} 5 cases of recurrent measles in the same family.

S. Zichy-Woinarski, of Ballarat, Victoria, ²⁶⁷_{Oct. 15, '93} reports a case of uræmia sequent to measles. The patient was a child of 6 years, and developed the exanthem in the usual course; but about the nineteenth day the urine became diminished in quantity, and three days later the patient rapidly became comatose, the urine highly albuminous, and death followed. Claus, of Dresden, ³⁶⁶_{June 5, '94} reports a case of severe stomatitis and one of miliary tuberculosis following measles.

Diagnosis.—Clement Dukes, ⁶_{Mar. 31, '94} gives in detail the distinguishing characteristics between measles and rōtheln, of which we note briefly the principal ones. In measles there are usually considerable malaise, headache, anorexia, vomiting, watery eyes, catarrh, and characteristic cough for about three days before the appearance of the eruption; if the attack of rōtheln be severe, some malaise, anorexia, and drowsiness will exist, but no headache, vomiting, catarrh, or cough, although frequently some sore throat. The eruption in measles is *brick-red* in color, and may gradually

assume a blue-red tint, but never a bright *rose-red*. In measles the fauces are red and swollen, but differ from the fauces of r \ddot{o} theln. In measles the conjunctivæ are more red and the eyes are watery, with marked photophobia; in r \ddot{o} theln, pink-red and suffused. In measles the glands are not usually affected, the posterior cervical rarely, and these not markedly, but the bronchial glands are always enlarged; in r \ddot{o} theln the lymphatic glands throughout the body are enlarged, tender, and hard, like peas,—notably the posterior cervical, the axillary, and the inguinal. Diarrhœa is frequent in measles, but is never noticed in r \ddot{o} theln. In measles the sensations of illness are profound, patients continually suffering from delirium and complete anorexia, and lying prostrate; in r \ddot{o} theln the patients do not feel ill. Convalescence is more protracted in measles, and there is often considerable prostration; the duration of infection is from four days to a week longer than in r \ddot{o} theln. Pneumonia, bronchitis, pleurisy, ophthalmia, otitis, etc., are noted as sequelæ in measles; in r \ddot{o} theln there are practically no sequelæ.

J. T. Whittaker⁴²⁶_{Nov., '93} observes that in measles the temperature does not keep up quite so long as the eruption lasts, in this point differing from scarlet fever. Lachlan Tyler¹_{Sept. 1, '94} reports a case of measles with symptoms somewhat simulating those of phenacetin poisoning.

J. C. Wilson, of Philadelphia,¹_{Aug. 4, '94} reports a case of malignant measles, in an adult, in which the direct diagnosis rested on the exposure to the disease, the faint and limited, but distinct, maculopapular eruption, its crescentic arrangement, and the existence of fever, the symptoms simulating those of typhus fever, purpura fulminans, cerebro-spinal fever, and variola.

Treatment.—J. Comby, of Paris,³¹_{Jan. 6, '94} draws attention to the value of disinfection, in its various forms, in the treatment and prophylaxis of measles complicated with broncho-pneumonia. In uncomplicated cases the indication for disinfection is rarely a pressing one. The germ of the malady has but an ephemeral existence (two or three hours); contagion is only possible in the first few days (two to four days), by direct contact or within a circumscribed radius (three or four metres). Comby advises, as a prophylactic measure, the disinfection of the nasal fossæ, the mouth, pharynx, genitals, and anus. This protects the patient from sec-

ondary infection, and should always form a part of the treatment. The parts soiled by the dejections (the vulvæ, genitals, and anus) are washed, morning and evening, or more frequently if required, with boric acid dissolved in warm boiled water (4 to 100). For the mouth, nares, and pharynx, he uses the same solution, borated glycerin, or borated liquid vaselin, as a lotion, gargle, or for irrigation. Small tampons of absorbent cotton, moistened with borated glycerin or vaselin, are introduced within the nares; an application of the same solution is made to the pharynx. Two or three applications daily sterilize the passages and prevent the growth of the pathogenic microbes. In young or refractory children the borated solution may be used in spray.

Paul Huguenin, of Paris, ³⁷⁸_{Aug. 23, '94} advises a diet of sterilized milk, bouillon, and eggs, if age and digestion permit. Acid drinks, taken midway between the portions of milk, are grateful. Frequent lavage of the eyes, nose, and ears with warm boric-acid solutions and frequent irrigations of the throat with salicylic-acid solution (1 to 1000) are advised. If epistaxis be present, a solution of antipyrin (1 to 50) should be used, and some of the drug in fine powder given as snuff. The surface of the body should be bathed with warm water. If nervous symptoms are present, warm aromatic baths or a general mustard bath for five or six minutes in older children, or for two minutes if the child is very young, are advised. These may be repeated five or six times daily, and a dose of bromide or musk may be given at the same time. If intense bronchitis is present, sinapisms may be applied over the whole chest four times daily, and a tablespoonful of the following may be given every two hours, as advised by Widerhofer: Hyoscyamus extract, 0.05 to 0.15 gramme ($\frac{3}{4}$ to $2\frac{1}{4}$ grains); simple syrup, 10 grammes ($2\frac{1}{2}$ drachms); distilled water, 70 grammes ($2\frac{1}{3}$ ounces). An emetic may also be given if the condition of the child is good. If broncho-pneumonia supervene, the patient should be rigorously isolated, especially from other measles patients. If the temperature remain high (39.5° to 40° C.— 103.1° to 104° F.) several days after the appearance of the eruption, frequent tepid baths (35° to 36° C.— 95° to 97° F.) are of especial service, but the patient must be closely watched and given an occasional whiff of ether and some caffeine alternately. Benzonaphthol, bismuth salicylate, paregoric, and enemata of lactic-acid

solution (1 to 200) are useful if diarrhœa is present. If the laryngitis is intense and suffocation imminent, intubation is indicated, *and not tracheotomy*; if the former cannot be performed, the latter should only be resorted to *in extremis*. In scrofulous cases cod-liver-oil and iodized syrup of horseradish should be given alternately throughout convalescence.

Bicente, ¹_{Apr. 21, '94} advises the use of potassium iodide in the broncho-pneumonia of measles. He gives it in daily amounts of 0.20 to 0.80 gramme (3 to 12 grains), according to the patient's age. At the same time he uses one or more blisters and supports the patient's strength by means of grog, bouillon, and milk. If, after the child is getting better, tremulousness and dryness of the mouth are observed, iodism is to be feared and the drug stopped.

C. R. Illingworth ²²_{May 30, '94} claims good results from the use of a solution of mercury biniodide and potassium iodide; the drugs, he claims, kill the germs by circulating through a fibrin-containing fluid, in virtue of the fact that the former drug is held in solution by the latter (potassium iodide), which diminishes the tendency to the formation of fibrin-potassic iodide.

VARICELLA.

Autonomy.—It is a current opinion that varicella is a disease entirely distinct from variola and its abortive form, varioloid, and that it possesses an autonomy, a specificity, entirely its own; in other words, varicella always arises from varicella, and, in its turn, can only give rise to the same affection. This belief is contrary to that held by the ancients, and it was not generally admitted until Trousseau clearly differentiated varicella from variola and varioloid. In Germany the theory of the unity of these diseases has found many adherents, among whom may be mentioned von Hebra, Kaposi, Kassowitz, Hochsinger, and others, who declare that these three maladies are identical in nature; according to the degree of immunity possessed by the patient attacked, either through vaccination or through a previous attack of variola, the disease manifests itself as varioloid or, if in a more attenuated degree, as varicella. Talamon ³¹_{Jan. 29, Feb. 7, '94} voices the same opinion and says: "Varicella, vaccinia, varioloid, and variola are different forms of the same disease, the different effects of the same virus, or of the same micro-organism modified, attenuated, or exalted, by successive

passages from man to animal and from animal to man. Through contact with a small-pox patient, a person incompletely immunized will develop varioloid; through contact with a patient having vaccinia, a person whose vaccinal immunity is imperfect will develop varicella. Varicella is to vaccinia what varioloid is to variola." Cëttinger, of Paris, ³_{Jan. 31, '94} takes exception to the foregoing and declares in favor of the specific autonomy of varicella.

Complications.—L. Boucheron ¹¹⁵³_{Feb. 17, '94} draws attention to accidents affecting the larynx, the bronchi, and the lungs, which sometimes supervene in the course of varicella and impair the renown for benignity enjoyed by this disease. Along with broncho-pneumonia and pleurisy by secondary infection, for which varicella prepares the way, it must be admitted that there is a primary disposition on the part of the eruption to attack the mucous membrane of the air-passages. Certain cases show that not only stomatitis, but laryngitis, broncho-pneumonia, and perhaps even pleurisy, may be of a varicellous nature. The author relates an interesting case of his own,—that of a little girl who, already weakened by a preceding attack of pertussis, was seized with varicella characterized by successive eruptions and died about the twentieth day in consequence of laryngeal spasm. At the necropsy nothing was found to explain the occurrence of the spasm except vesico-pustules similar to those of the cutaneous eruption occupying the laryngeal mucous membrane at the level of the arytenoid cartilages and the posterior portion of the vocal cords. This is thought to be the first case of the kind recorded.

Augier, of Lille, ²²⁰_{Apr. 23, '94} reports a case of varicella, in an infant of 20 months, in which the complications were a scarlatiniform rash accompanying the usual one, convulsions (uræmic), an ulcerating and gangrenous condition of the varicella pustules, and a diffuse fatty degeneration of the myocardium. The author observes that nephritis—not an infrequent complication of varicella—is generally observed in patients who have previously been the subject of some infectious malady in which the kidneys have been involved. It usually appears about the fifteenth to the twentieth day of the disease.

John Thomson, of Edinburgh, ⁵¹_{Mar., '94} reports a case of hæmorrhagic varicella, with pemphigoid bullæ, ending in death. The

patient's skin was livid all over. The eruption consisted, first, of a large number of small spots,—papules, vesicles, pustules, scabs, and slightly-depressed scars. They were scattered over the face, scalp, trunk, and limbs, and had mostly small hæmorrhages into them; in other respects they had all the appearance of a severe varicella eruption. There were none to be found on the mucous membranes. Secondly, in addition to the small spots, there were a great many large, irregular-shaped, rounded, raw areas left by the bursting of the before-mentioned bullæ; many of these measured from one to two inches (2.5 to 5.0 centimetres) in diameter, and they ran into one another in several places; most of them were hæmorrhagic, but, although the affected areas were livid and unhealthy in appearance, there was no evidence of gangrene in connection with any of them. A few of the bullæ were situated on the abdomen, but the great majority were found on the back, where they were so numerous and large as to cover at least a third of the whole area of the skin.

In another case reported by him, ⁵¹_{Mar., '94} eight or ten large bullæ appeared on the back of the neck and shoulders, though not elsewhere; but in no situation was the eruption hæmorrhagic. The ordinary varicella eruption was scattered over the body in both cases. Variot and Dansaux ²¹²_{Dec. 10, '93} report a case of gangrenous varicella in which pemphigoid bullæ were present.

Sequelæ.—William Gay, of London, ²_{Mar. 31, '94} reports an interesting case of peripheral paralysis (paraplegia) following varicella. It did not conform to the type of nerve-lesion found in the paralysis following measles, since the area of nerve-disturbance was definitely localized and the affection, after a sudden onset, ended, in a short time, in complete recovery.

Varicella in Adults.—H. G. Lys, of Bournemouth, ⁶_{May 12, '94} had under his care three sisters, all adults, suffering from typical varicella. The first case was not traceable to a definite source of infection, but the disease was prevalent in the district. The latter two cases arose exactly fourteen days after the onset of the first case, and were no doubt contracted from the sister. On the ground that infection of adults was so rare, the sisters had been allowed to associate together. Malcolm Margrave ⁶_{Mar. 10, '94} reports typical varicella in a woman aged 31 years. An editorial ⁶_{Mar. 10, '94} remarks that the disease is rare in adults, probably because chil-

dren seldom escape attack by it. Other cases in adults are cited by the same author.

RÖTHELN.

Sevestre, of Paris, ⁶_{Nov.11,'93} states that, from notes he has taken of a recent epidemic of German measles at a Paris *lycée*, he believes himself in a position to formulate the following conclusions: Epidemics of röteln are characterized by successive outbreaks, separated the one from the other by an interval corresponding to the period of incubation—here a fortnight on an average. The disease is infectious from the beginning, like measles, and isolation of the patients is too late a measure, for they have already spread around them the specific germs. The desideratum is isolation of children who have been in contact with cases. These exposed persons should be closely watched, especially from the twelfth day after exposure, in order that they may be isolated on the appearance of the initial symptoms. Unfortunately, prodromata are, in the majority of cases, wanting, and preventive isolation is accordingly difficult to put into practice. Once the disease is over—*i.e.*, in about eight days—the patient is no longer dangerous to his neighbors, and he may be safely allowed to mix with his comrades. On this point Sevestre differs *in toto* from Ollivier, who insists upon a quarantine of twenty days and the taking of an antiseptic bath, as well as the closing and the disinfection of the school that has been the *locus* of the disease. In the epidemic observed by Sevestre the patients remained in the infirmary for a period of from seven to twelve days, and were then allowed to resume their studies. No instance of infection was noted. Disinfection of the room, furniture, etc., is, according to him, unnecessary, the specific microbe being, like that of measles, endowed with a very limited vitality.

Juhel-Rényon ⁶_{Nov.11,'93} lays stress on the importance of an early diagnosis, and states that the apyrexia, so commonly attending röteln, is an altogether exceptional phenomenon in measles. If, then, a child affected with a measly eruption is apyretic, röteln may be almost certainly diagnosed. Of 4 cases observed by Rendu in the same family, 2 had fever and 2 had none.

Clement Dukes, of London, ⁶_{Mar.31,'94} gives the features which distinguish röteln from measles and scarlet fever. He notes that there are three other eruptions which have a close resemblance to

that of rötheln : one is roseola simplex, which arises in hot weather, after chill or from indigestion, readily distinguished by the absence of enlarged lymphatic glands ; another eruption is that occasioned by the handling of caterpillars ; the third is a medicinal eruption occasioned by copaiba, which Hutchinson called the *morbillo sine catarrh.*

Theodore ¹⁵⁸_{B.16,H.1,2} reports a case where measles followed rötheln on the fifth day. The cervical glands, which had become enlarged during the course of the rötheln, resumed their normal size while the measles was at its height. The further course was that of a severe attack of measles. Leflaire ¹⁵⁸_{B.16,H.1,2} reports of four children who had measles, and six weeks later came down with rötheln. Kramsztyk ¹⁵⁸_{B.16,H.1,2} has reported instances in which epidemics of measles and rötheln followed each other very closely. The characteristic sign is, according to the author, the cervical glandular enlargement appearing with the rash.

RHEUMATISM AND GOUT.

By N. S. DAVIS, M.D., LL.D.,

CHICAGO.

ACUTE AND CHRONIC RHEUMATISM.

Etiology.—W. Leube, ⁶⁹_{Jan. 4, '94} having observed some two hundred cases of muscular rheumatism, arrives at the conclusion that both muscular and articular rheumatisms are infectious and probably caused by an attenuated form of micro-organism. He, however, furnishes no microscopical or other demonstration of the existence of such micro-organisms in the cases under his own observation. D. T. Taylor, of Washington, N. C., ⁴³_{Nov., '93} after tracing some analogies between the symptomatology of rheumatism and malarious fever, declares that “the rheumatic poison is a minute organism which is propagated in and acts on the fibrous tissue of the motor apparatus of the body, and is, of course, carried about in the blood”; but, like Leube, he fails to make any demonstration of the supposed *organism*. Several other writers, like J. Byron Newman, ¹⁸⁵_{Apr., '94} assume that rheumatism is caused by micro-organisms circulating in the blood, but no additional proof of their assumption has appeared since the examinations by Sahli, as noted in the ANNUAL for 1894. G. A. Sacharjin ⁶⁹_{June 21, '94} claims that several different pathological conditions have been included under the head of chronic rheumatism, and that they arise from many causes, among which he names acute rheumatism, the gonorrhœal poison, syphilis, tuberculosis, gout, cold, slight traumatism, and abuse of alcohol. A. P. Dass, of Calcutta, ¹⁰⁵⁵_{Aug. 1, '94} relates a well-marked case of acute articular rheumatism in a child only 5 months old. The child had been suffering from a disordered condition of the digestive organs, which constituted the predisposing, while exposure to cold appeared to be the exciting, cause of the attack. John R. Page, of Birmingham, Ala., ⁴⁰_{June, '94} in an article of some length, on the etiological relations of rheumatism, rheumatoid arthritis, gout, and lithiasis, endeavors to trace all these affections to “one and the same cause,—viz., a perversion of the glycogenic function of the liver and contamination of the blood.” Ghouppe ¹⁴_{Nov. 5, '93} discusses the

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arguments and facts for and against the dependence of rheumatism on specific micro-organisms; M. J. Auclair ¹⁴_{Feb. 18, '94} presents the connection of angina, or tonsillitis, with acute articular rheumatism; and M. A. Chauffard ¹¹_{July 8, '94} reviews the etiological relations of acute articular rheumatism and pseudo-infectious rheumatisms; but all without adding new facts or arriving at satisfactory conclusions. M. Spruyt, of the military hospital at Antwerp, ⁴⁵⁴_{Dec., '93} appears to be more correct in referring ordinary rheumatic attacks to the more common causes and limiting the influence of bacteria to such cases as are associated with other well-known infectious diseases, as gonorrhœa, diphtheria, scarlatina, etc. A. Robin and Sireddle, of Paris, ³_{Sept. 12, '94} mention cases of acute articular rheumatism associated with typhoid fever. At the meeting of the French Association for the Advancement of Science in Marseilles, ¹⁴_{Aug. 19, '94} Charrin gave the results of the bacteriological researches of himself and Bouchard in 22 cases of chronic articular rheumatism. In 11 cases they found the bacillus albus, in 4 the streptococcus, in 3 the aureus, in 2 the coli, and in 2 none.

Pathology.—David Lees ¹⁰⁷⁷_{June 27, '94} presented a boy, aged 5 years, who had suffered more than a year from increasing chronic rheumatic arthritis. It affected chiefly the smaller joints of the fingers, hands, and wrists, but extended somewhat to the elbows; and on the backs of his fingers were many glossy nodules, and some less distinct on the scalp. While the symptoms of the child were rheumatic, his mother stated that his paternal grandfather had suffered much from gout; and Hutchinson remarked, in the discussion, that he had long held that these “rheumatic nodules” were the result of inherited gout, as he had shown in two previous cases. But he further stated that the nodules contained no urate of soda. Another case of subcutaneous rheumatic nodules was presented to the Glasgow Medico-Chirurgical Society by Middleton. ²¹³_{Sept., '94} The patient, a boy aged 14 years, was suffering from cardiac disease of rheumatic origin.

Z. von Manteuffel, ⁴⁵¹_{Feb., '94} attributes many cases of so-called rheumatism of the lower extremities to arterio-sclerosis. The more distinctive symptoms are indefinite pains, frequently changing from the sole to the top of the foot and around the heel, while the skin is blanched and dry as if rubbed with meal, and there is absence of rose color in the nails.

Thomas O. Summers, of Waukesha, Wis., ⁶¹_{Jan. 27, '94} attributes to the white corpuscles, or leucocytes of the blood, an important part in the pathology of rheumatism. He says: "The cause of pain in rheumatism is undoubtedly due to the migration of the white blood-corpuscles which, continuing to live outside the vessels, not only appropriate nutritious material to their own use at the expense of the normal tissues of the body, but become bloated with riotous living, swell up inordinately, and impinge inconveniently upon space belonging to the delicate nerve-filaments distributed to contiguous structures." Hans Frœlich, of St. Louis, Mo., ⁶⁶³_{Jan., '94} in a paper of considerable length on lymphostasis, endeavors to place the essential pathology of rheumatism in the lymph and its circulation in the lymph-spaces and vessels. He states that various causes "can produce a stagnation in the lymph-system, which is principally confined to the lymph-spaces. The lymph-fissures become extended by this engorgement, and the Grawits dormant cells provoke a small cellular hypertrophy of tissue with deposition of fibrin." This retarded flow of lymph is said to cause the nutritive fluid that surrounds the parenchyma of muscle and nerve to be insufficiently renewed, and hence they become exhausted. He likens these changes to the interstitial hyperplasia of the larger glands. He regards the nutritive disturbance described as "probably of a chemical, not bacterial, nature."

Treatment.—Nearly all the writers on acute articular rheumatism during the past year still give the salicin, salicylic acid, and salicylates the first place in its treatment. but there is a manifest tendency to use the salicylates less exclusively, and to give more attention to the correction of associated functional disorders by older remedies.

N. Ontagnon and L. Ducher, pharmacists of Hôtel-Dieu, ²²⁸_{July 15, '94} propose a new remedy, which they name *Malakine*. It appears to be a salicylate combined with an organic base, the formula of which is given in the article, and its effects in detail in the treatment of four cases. Its antipyretic effect is said to correspond closely with that of phenacetin, and is less liable to produce unpleasant effects on the head and the stomach than the salicylates. During the discussion of a paper on myalgia, or muscular rheumatism, in the California Northern Medical Society, ¹⁴⁷_{Nov., '93} W. E. Bates, of Davisville, recommended the use of iodide of potash, cimicifuga,

and wine of colchicum; and F. R. Clark, of Stockton, stated that he obtained prompt and complete relief in six cases of sciatica by giving croton-oil in $\frac{1}{8}$ -drop doses every hour until free intestinal discharges were produced. He further stated that Kelly, of Kentucky, had obtained the same happy result in the treatment of fifty successive cases. Clark said he had given the croton-oil in the same manner in other forms of neuralgia and rheumatism without a failure. He gives the remedy made up in pill form, $\frac{1}{8}$ -drop in a pill, one every hour until it operates as a purge.

Drappier, of Ardennes, ²²⁰_{Sept. 15, '94} has used pilocarpine with success in some cases of acute articular rheumatism in which the sodium salicylate did not act kindly. Jules Simon, of Paris, ¹⁴_{Dec. 6, '93} in an excellent clinical lecture on rheumatism in young children, recommended chiefly the salicylates in the acute and subacute forms, but in the chronic cases stated that he preferred to use tincture of colchicum in doses of 10 drops an hour before dinner for eight days, resuming it after an omission of five or six days, until the swelling left the joint, when tonics were given.

Aug. Dyes, of Hanover, ⁵⁷_{Apr. 8, '94} reports a severe case of chronic rheumatism in a sailor, 50 years of age, whom he bled 120 grammes (4 ounces) with marked benefit. At the end of fourteen days the bleeding was repeated and the patient made a good recovery. D. N. Stewart, of New York, ⁷⁶⁰_{Oct. 22, '93} emphasizes the importance of using freshly-prepared sodium salicylate in the treatment of rheumatism, claiming that the drug deteriorates by keeping, and hence as found in the drug-stores is often worthless. W. F. Waugh, ⁷⁶⁰_{Oct. 22, '93} reviews in a sensible way the prevalent ideas and practices concerning rheumatism, but adds nothing new. A. W. Shotwell, Mount Clemens Springs, Mich., ¹⁸⁶_{Jan., '94} recommends the use of osmic acid, in the form of hypodermatic injections, as permanently beneficial in the treatment of sciatica with rheumatism. Holzschneider, of Cronenberg, ¹¹⁶_{July, '94} and M. Koester, ¹⁵_{Aug., '94} both report favorably on the use of salophen in the treatment of acute rheumatism. The latter gave it in daily doses of from 4 to 6 grammes (1 to 1½ drachms) until the pain and temperature were reduced. Dujardin-Beaumetz, of Paris, ⁸⁵⁵_{Mar., '94} discusses the whole subject of acute and chronic rheumatism, in an interesting and instructive manner, and speaks of asaprol as preferable, in some respects, to salicylic acid or antipyrin.

Hugo Engel, of Philadelphia, ¹⁷⁶_{Dec., '93} insists on the great advantages of chemically-pure salicylic acid in the treatment of rheumatism. Nathan Raw, of Dundee, Scotland, ⁶_{June 9, '94} reports a case of acute rheumatic hyperpyrexia, in which the temperature rose to 108° F. (42.2° C.), but was promptly relieved by the cold bath, and the patient made a good recovery. *Per contra*, A. E. Godfrey, of North Finchley, N., ²_{Nov. 4, '93} reports a case in which the temperature twice rose to 106° F. (41.1° C.), and was reduced by 10-grain (0.65 gramme) doses of antipyrin. This was followed by 20-grain (1.3 grammes) doses of sodium salicylate every two hours, during which the temperature rose to 112° F. (44.4° C.), and the patient died comatose. D. W. C. Hood, ²_{Nov. 18, '93} very properly characterizes the use of large doses of such antipyretics as antipyrin and sodium salicylate in hyperpyrexia as dangerous, and commends the use of the cold bath. Bourget, of Lausanne, ¹¹⁶_{Nov., '93} gives the results of experiments showing that salicylic acid is readily absorbed through the skin in sufficient quantity to render it an efficient mode of treatment, provided it is applied in a proper vehicle. He used the following formula in nineteen cases of acute articular rheumatism with the most satisfactory results:—

R Salicylic acid,	12 grammes (3 drachms).
Lanolin,	12 grammes (3 drachms).
Ol. turpentine,	12 grammes (3 drachms).
Lard,	96 grammes (3 ounces).

M. ft. ung., to be rubbed freely over the affected articulation, and followed by wrapping in cotton. The treatment is especially appropriate in children, and is most efficacious in acute cases.

Gonorrhœal Rheumatism.—Ramon Guiteras, ¹_{Mar. 24, '94} in a paper read in the Section of Genito-Urinary Surgery of the New York Academy of Medicine, gave a concise and interesting statement of what is known concerning the nature and treatment of gonorrhœal rheumatism, both acute and chronic. He stated that “oleum gaultheria is of value in both acute and subacute stages of this variety of rheumatism, and comes the nearest to a specific of any of the many remedies used.” He recommends giving it in doses of from 5 to 20 drops (minims) every two hours in milk. Ichthyol ointment was also recommended as a local application. Richardi re, of Paris, ¹⁷_{Oct. 25, '93} states that this form of rheumatism has been observed in children as early as the twentieth month, and through all periods of childhood, but more frequently in girls between 5 and

10 years of age. E. Chiaiso and L. Isnardi, of Turin, ⁹⁰⁷_{Feb. 15, '94} give the history of a case of gonorrhœal rheumatism with visceral complications in a girl aged 10 years.

GOUT.

Etiology and Pathology.—Mabboux, of Contrexéville, ⁹²_{Aug., '94} discusses at considerable length the connection of gout with disturbances of the functions of the pneumogastric nerve, and relates several illustrative cases. J. Hutchinson, of London, ⁸⁰⁶_{Jan., '94} relates several cases of what he calls “a peculiar form of hypertrophic acrodermatitis in association with gout.” Sir James Grant, of Ottawa, Canada, ⁵⁹_{Nov. 11, '93} in a communication to the New York State Medical Association, related one case of pneumonic gout and one of perityphlitic gout. Grube ⁶⁹_{Nov. 23, '93} also relates two cases of pneumonia in patients who had suffered from attacks of gout. Three days after the onset of pneumonic symptoms well-marked gout in the extremities supervened, and all signs of pneumonia rapidly disappeared. Henry Burchard, of Philadelphia, ⁷⁶⁰_{May 19, '94} in a paper read before the Philadelphia County Medical Society, discussed the evidences of connection between the pericementitis, often met with in the gums and alveoli, and the gouty diathesis. Sufficient evidence is furnished by him and E. C. Kirk ⁶_{Jan. 30, '94} to render it probable that many of the cases of phagedenic pericementitis that obstinately resist local treatment are dependent on a lithæmic or gouty constitutional condition, and are most readily relieved by the proper hygienic and antigout remedies. The condition designated as lithæmia by various writers is generally regarded as closely allied to, if not identical with, true gout. John V. Shoemaker, of Philadelphia, ¹_{Jan. 2, '94} in discussing this subject, says: “Quite recently Professor Da Costa stated that there may be other excrementitious or pathogenic principles at fault besides uric acid, and strongly objected to narrowing the consideration to a single chemical substance. For him lithæmia is a morbid state in which the income of nutrition is in excess of the outgo of waste. There is defective oxidation as well as deficient elimination. Consequently, the functions of the liver are imperfectly performed; the blood contains urates in excess and frequently oxalates, also other imperfectly-elaborated products of waste; possibly it may be yet further poisoned by ptomaines resulting from imperfect gastric and intestinal digestion.” This view

is corroborated by Sir William Savory, of London, Jan. 13, '94 in a lecture on "Gout in Some of its Relations to Surgery." Speaking of the pathology, he says: "In gout, no doubt, the process of nutrition is primarily at fault, and conspicuously that part of it which consists in the retrograde changes and elimination of tissue-products. Oxidation in its various stages and degrees is not thoroughly carried out, and the products of the waste and decay of the tissues, not being sufficiently transformed, linger in the blood and system, and appear to take an active part in the disturbances which arise." C. Mordhorst, of Wiesbaden, Sept., '94 in a paper before the Eleventh International Medical Congress, claimed that the acids in the body oppose the destruction of the nitrogenous bodies, including uric acid; the more alkaline are the body-fluids, the more rapidly will be the destruction of the already-formed uric acid, and the less danger will there be from uric-acid deposits.

Treatment.—The writer last quoted also claims that, of all the remedies for reducing the acidity of the body-fluids, bicarbonate of sodium is the best and the least liable to do injury. The medical literature of the past year appears to contain no new remedy for the treatment of gout in any of its aspects; and, while there are differences among the most eminent investigators concerning the exact influence of particular causes in producing the various phenomena of the disease, all are agreed that the essential pathology consists in a disorder of the retrograde metabolism by which irritative material is made to accumulate in the blood or tissues. Consequently, all agree that the first object of treatment, in the acute stages, is to promote the elimination of the offending material, and the second to prevent its reproduction.

For accomplishing the first, colchicum, carbonated alkalis, iodine, and other evacuants are chiefly relied upon. Concerning the first remedy named, Lecorché July 14, '94 says, "it is *par excellence* the specific for gout." To accomplish the second object, all concede that the chief reliance must be placed on proper hygienic measures.

But there is much diversity of opinion concerning what constitutes proper diet and drink. In the lecture from which we have already quoted, Sir William Savory says: "If gout essentially depends on a want of due proportion between the supply of food (or fuel) and the processes of its due change and oxidation, it

should be in some way the outcome of excess of diet or deficiency of exercise, or of both these causes combined; and this is certainly what we very commonly find to be the case." The practical question, then, is not so much what articles of food are chemically most liable to be converted into uric acid, but what articles and what amount will the individual patient most perfectly digest, with the aid of proper air and exercise? Concerning the use of alcoholic drinks, the following conclusion of Sir William Savory cannot be too strongly commended, viz.: "But withal, the stern fact remains, and insists on recognition, that, with very rare exceptions, alcohol is mischievous in gout,—mischievous in every form; although, no doubt, the degree varies with the substances combined with it. There is a difference, in this respect, between wine, spirits, and beer, and a much greater difference between good and bad wine; but, as a rule, for the prevention of gout, perhaps in the case of *all men, the less alcohol the better.*"

DISEASES OF THE BLOOD AND SPLEEN.

BY F. P. HENRY, M.D.,

AND

ALFRED STENGEL, M.D.,

PHILADELPHIA.

GENERAL CONSIDERATIONS.

Engel⁶⁹_{Nov. 30, '93} demonstrated, before the Berlin Medical Society, the processes of blood-formation as observed by him in embryonal blood. The stages are as follow: A primary, nucleated, colored blood-disc—the mother-cell—divides into a part without and a part with a nucleus. The latter again divides, the extruded nucleus forming white corpuscles or, by segmentation, blood-placques, and the non-nucleated part red corpuscles of the second generation. Wythe, of San Francisco,⁶¹_{July 28, '94} discovers, under the influence of various solutions, certain protuberances and segmentations of the body of the red corpuscle, which he regards as the natural degenerations of the corpuscles, hastened, perhaps, by the solutions added. “Many of the corpuscles appeared as concentric rings in a flat disc around a central nucleus.” The latter appearance seems also to have been observed by Winkler.⁸⁴
Bremer³⁶⁵_{May 19, '94} ⁴⁵¹_{Aug. '94} asserts that the blood-placques are decomposition products of the red corpuscles and that they may be seen within the red corpuscles or just extruded. Within, the placques may at times be seen of a ball-shaped formation, which he regards as the so-called elementary bodies of the blood. The white corpuscles, he thinks, have nothing to do with the formation of placques.

Sacerdotti⁶⁹_{Sept. 13, '94} denies the view of Löwit and Lilienfeld, that the blood-placques are artifacts. He thinks that they exist in the circulating blood and that they are comparable to the spindle-shaped cells found by Recklinghausen in the blood of certain egg-laying vertebrates. They are biconvex, not biconcave, discs, and not hæmatoblasts.

Pizzini⁵⁸⁹_{Nos. 107, 108} finds a decided increase in the number of the
(L-1)

blood-placques during febrile affections of all kinds, as well as in the period of convalescence of the simple, afebrile anæmias.

Cabot ⁹⁹_{Mar. 22, '94} contributes a very interesting paper on the diagnostic and prognostic significance of leucocytosis. A great variety of diseases are considered, but most importance attaches to the results in typhoid fever, pneumonia, and suppurative conditions. In typhoid fever Cabot found the normal or a decreased number of leucocytes,—leucopenia. Only once in 79 cases was there leucocytosis, and this was in a child of 4 years. During complications leucocytosis may develop. In pneumonia the results were equally important. The author has added 24 cases to the 48 previously reported, making 72 in all. There was no leucocytosis in but 7, and of these 6 died. The seventh, though apparently in fair condition when leucocytosis was discovered, shortly fell into a serious condition, but recovered. The prognostic significance of absence of leucocytosis seems, therefore, considerable. Diagnostically its presence helps to distinguish pneumonia from grip in uncomplicated cases of which no leucocytosis occurs. It may further anticipate the occurrence of pneumonia as a complication in grip.

Considerable interest attaches to the results in appendicitis. In three cases, proved by operation to be catarrhal, no leucocytosis was found. In all cases but two, in which pus was found, leucocytosis was present. The author is not explicit in detailing his statistics in this matter. The presence or absence of leucocytosis in other conditions attended by suppuration was shown by examinations in empyema, pus-tubes, felons, etc.

Maurel ¹⁰⁸⁸_{Mar. 25, Apr. 1, 8, 15, '94} contributes an interesting paper on the *hypoleucémie* of Héricourt and Richet, showing that the diminished number of leucocytes is not real, but due to their arrest in the finer capillaries. He therefore suggests that the term “false hypoleukæmia” be adopted. This arrest of the white cells may be due either to vasomotor constriction of the small capillaries or to direct action of poisonous agents upon the leucocytes, giving them a spherical shape and sluggish, amœboid movement. The latter view is reasonable and confirmed by experimental evidence. It is also the view expressed by Goldscheider and Jacob, ²⁰⁵⁵₉₃ based upon their experimental work, which seems to indicate the pulmonary capillaries as the point of arrest of the leucocytes.

Richet and Héricourt ¹¹_{Dec. 27, '93} found that the same temporary

hypoleucocytosis resulted from injections of plain bouillon as they previously observed in injecting bouillon containing sterilized cultures of the tubercle bacillus. The action is, therefore, not due to toxins, but they have been unable to find what ingredient of the bouillon is the active agent.

Goldscheider and Jacob⁵⁷_{June 10, '94} found, in cases of hypoleucocytosis following intra-venous or hypodermatic injection of various organic extracts, that the capillaries of the lungs were densely packed with leucocytes, and regard this as a chemotactic phenomenon. The subsequent hyperleucocytosis is due to the passage of the injected substances into the lymphatics, with consequent increase of leucocytes in the vascular channels.

Tschistowisch²¹_{June 30, '94} found, by direct addition of solutions of peptone and tuberculin to blood, that no destruction of leucocytes takes place, which is contrary to the view of Löwit.

Rovighi¹¹⁶⁹_{P. 3, '93} discovered that elevation of temperature tends to decrease the number of leucocytes in the circulating blood, while cold has the opposite effect. These phenomena, however, are due merely to increased or decreased circulation of the leucocytes.

Engel¹²⁶_{July 15, '94} found, in a case of a rachitic child with pseudo-pernicious anæmia, that arsenic increased the myelocytes and small, nucleated, red corpuscles and decreased the polynuclear leucocytes, lymphocytes, and normoblasts.

Krüger²¹_{Oct. 7, '93} found, in examination of the white corpuscles in the defibrination of blood, that there is a destruction of white corpuscles amounting to 45 or 70 per cent. of their total number, but that this destruction concerns mainly the multinucleated forms.

Everard and Demoor²⁹³_{Aug., Sept., '93} point out that in many of the infectious fevers there is, first, a period of leucocytosis, followed by a decrease of leucocytes, leucocytosis being re-established with the decline of the fever. In experimental infection with a number of bacteria much the same conditions were observed; and it was noted that the increased number was mainly in leucocytes having a large, vesicular, regular nucleus.

Mairet and Bosc¹⁴_{Aug. 1, '94} conclude, from their experiments, that the toxic property of blood-serum is quite distinct from the coagulating property, and that the symptomatic effects of injections of serum are due to the former, and not the latter. The substances concerned are, in each case, albuminoids. W. S. Carter¹¹²_{Dec., '93} pre-

sents an interesting paper on the globulicidal and toxic action of blood-serum. The most marked effects in both relations were obtained from injection of human serum into rabbits. In various animals the behavior of the serum is varied. No law can be laid down. There seems to be a number of albuminoid poisons; and those causing toxic and globulicidal action are certainly distinct. Hayem ¹⁴_{Apr. 18, '94} points out that the effects of injections of blood-serum depend upon the relative strength of that of the animals under experiment. Small doses of horses' serum injected into rabbits or dogs cause temporary hæmoglobinuria; stronger doses, all the signs of renal insufficiency and uræmia. When dogs' serum is injected into the rabbit or horse, small doses cause great dyspnœa; large doses cause rapid death.

Otolenghi ⁵⁸⁹_{No. 106, '94} injected into animals serum from other animals killed by slow asphyxia and syncope. The serum in syncopal death was not toxic. From his experiments he concludes that poisonous leucomaines are produced in the tissues in asphyxia.

Miescher ²¹⁴_{Dec. 10, '93} reviews the literature regarding the influence of altitude on the blood. His own investigations show a rapid increase of the number of corpuscles and of hæmoglobin in persons residing in higher altitudes and a reduction on descent to lower levels. If the increase is sufficient to maintain a normal oxygen-tension in the tissues, dyspnœa and other symptoms of decreased respiratory exchange are wanting. A permanent improvement of nutrition may result from a suitable elevation, whereas permanent injury may result from excessive altitude. Individuals would seem to differ in their capacity for withstanding the effects of change of altitude.

Wolff, ³⁴_{Nos. 41, 42, '93} in studying the blood of persons at Reiboldsgrün (altitude seven hundred metres), found an increase in the number of red corpuscles, which reached the highest point after fourteen days' residence. The quantity of hæmoglobin was diminished on account of the number of small corpuscles containing little hæmoglobin.

Glogner ²⁰_{B. 129, H. 1} reports the results of examinations of the blood of ninety-five Europeans and of fifty natives in Sumatra. The pallor of Europeans when living in warmer climates he finds is not due to decrease in the richness of the blood, but to vasomotor conditions.

Lazarus Barlow, ¹⁷⁸_{May 29, '94} in investigating the effect of increase or decrease of the volume of the blood on its specific gravity and on that of the muscles, found that increase of the volume of the blood caused increase of its specific gravity at once and subsequently reduction to normal. When the increase was due to injection of salt water, there was a primary fall, with increase to normal in a few hours. When the volume of blood was decreased, the specific gravity fell rapidly and slowly regained the normal. The specific gravity of the muscles fell when that of the blood rose, and the reverse.

Wright ²_{July 14, '94} contributes another interesting paper on methods of increasing and decreasing the coagulability of the blood. The former is best accomplished, as he has previously demonstrated, by administration of lime-salts,—calcium chloride seeming best for practical use. In four families of bleeders he found that the time of coagulation could be materially lessened, and in several instances hæmorrhages were actually checked by the use of this drug. A further aid to coagulability is the inhalation of carbonic-acid gas. With either substance care must be taken not to use too much, as coagulability may be subsequently lessened. Decreased coagulability is produced by the internal administration of tartrates and citrates, as well as by surcharging the blood with oxygen by rapid respirations. Alcohol exercises a similar influence. Sahli ³¹⁹_{June 2, '94} makes a preliminary report of some investigations of his pupil, Eguet, on the influence of injections of extract of leeches' heads on thrombosis. These experiments showed that, in rabbits, two or three times the quantity of the extract necessary to prevent thrombosis may be injected without untoward symptoms. The disadvantage, as far as practical uses are concerned, is the transitory effect and the large quantity of leeches required.

Haldane and Smith ¹⁷⁸_{May 29, '94} present some experiments bearing on the "specific oxygen capacities" of the red corpuscles. This term was introduced by Bohr to designate the ratio between the number of grammes of iron and cubic centimetres of oxygen in a given volume of blood saturated with air at the ordinary pressure and temperature. The authors thought differences in size and specific gravity might affect differences in certain corpuscles of the same blood, and that such might be separated by centrifugation. There was thus found a wide difference in the capacity of the corpuscles

of different layers. Hüfner¹⁸²_{p.120,'93} denies the theory of Bohr, that the specific oxygen capacity of the blood varies, even in the same species of animals.

Pembrey and Gürber¹⁷⁸_{Jan., '94} experimented with rabbits, to determine the respiratory exchange of carbon dioxide and oxygen after hæmorrhage, and found, in seven animals, no material change from the conditions of health. Even great losses do not diminish the respiratory exchange. Loss of blood up to 3 per cent. of the body-weight was borne with no great disturbance of the animals' functions. When the loss was much above 3 per cent., however, the hæmorrhage proved fatal.

Biernacki¹¹⁴_{B.24,H.5,6; June 16,'94}³¹⁹ finds that the color of the skin is a very uncertain guide to the condition of the blood. In anæmic diseases the quantity of potassium was decreased, that of sodium increased, that of iron decreased. The latter, however, was not the case in some unquestionably anæmic cases. He regards the decrease of albuminous bodies as a more important alteration in chlorosis than reduction of iron.

Bleibtren⁶⁹_{Nov.16,'93} points out that the quantities of albumin found in the blood-serum by von Limbeck and Pick are unreliable, because, in diluting blood with salt solution and then estimating the albumin in the clear liquid, they neglected to take into account the variability in the bulk of the corpuscular element. Their results, he believes, are uniformly too low.

Lilienfeld⁸³_{Dec.14,'93} contributes a report of careful analyses of the leucocytes obtained from the lymph-glands and thymus of the calf. The analyses are intricate, but will be found useful as guides for future work.

Biernacki³¹⁹_{Aug.4,'94} insists that Wendelstadt and Bleibtren are in error in regarding his and Jaksch's blood-analyses as unreliable because of their using the method of sedimentation of unaltered blood. Contrary to these authors, Biernacki finds that the corpuscles undergo serious modifications when the blood is mingled with salt solutions. The main fact pointed out is that the corpuscles normally contain a certain percentage of watery elements, which correspond to plasma. By mixture with sodium solutions this is more or less extracted, and, therefore, the residue would be heavier and contain more nitrogen—as they had found—than the unaltered corpuscles obtained by sedimentation.

Von Jaksch¹¹⁴_{B.24,p.429; Aug.25,'94} found that in health 100 grammes ($3\frac{1}{4}$ ounces) of moist red blood-corpuscles contain 5.2 grammes (80 grains) of nitrogen, corresponding with 34.5 grammes ($1\frac{1}{8}$ ounces) of albumin. During and after acute diseases the amount of nitrogen increases somewhat; whereas, in chronic diseases not causing anæmia, the amount is normal. In the anæmias there is a diminution, especially in chlorosis; but in pernicious anæmia there is distinct increase to as much as 6.48 grammes (101 grains) of nitrogen or 40.5 grammes ($1\frac{1}{4}$ ounces) of albumin.

Engel⁶⁹_{Nov.30,'93} describes a useful and simple method of marking slides so that a particular corpuscle may be found when desired. A thin, perforated tin-plate carries within the perforation a small central disc with raised edges, as indicated in Fig. 2. This plate

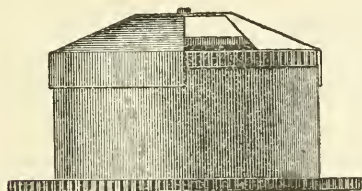


FIG. 1.

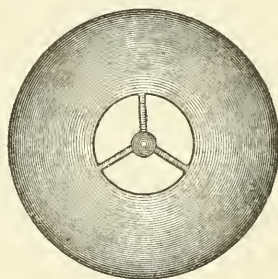


FIG. 2.

METHOD OF MARKING SLIDES. (ENGEL.)

Deutsche med. Wochenschrift.

is laid on the Abbé condenser, the raised edges of the central disc being covered with a little coloring matter. (Fig. 1.) It is then raised so as to touch the under part of the slide. A ring of color containing the corpuscle at its centre is thus established and facilitates subsequent search.

A. E. Wright²_{Feb.3,'94} describes the form of capillary tubes he has found most useful to test the rapidity of coagulation. These resemble an ordinary blood-mixer and are especially useful where the influence of certain solutions on coagulation is to be determined. The tubes, before and after filling with blood, should be kept at blood-heat. Solle²¹³_{Sept., '94} advocates the more general use of the spectroscope in the examination of the blood, and describes his method of procedure.

Elzholz⁵⁷_{June 3,'94} highly recommends the following method for

differential counting of leucocytes in fresh blood. After drawing blood into the pipette a solution composed of 7 grammes ($1\frac{3}{4}$ drachms) of 2-per-cent. eosin solution, 45 grammes ($1\frac{1}{2}$ ounces) of glycerin, and 55 grammes ($1\frac{2}{3}$ ounces) of water is added. Then a solution composed of 4 drops of concentrated watery solution of gentian-violet, with 1 drop of absolute alcohol and 15 grammes ($2\frac{3}{4}$ fluidrachms) of water. The polynuclear cells are deeply stained; the eosinophile are reddish violet.

Zappert ¹¹⁴_{B.23,H.3}; ⁵_{Mar., '94} has examined a large number of persons to determine the number of eosinophile cells. In health there are from 50 to 250 in each cubic millimetre, but an increase to 700 may occur. In leukæmia the absolute but not relative number is increased, the proportion to all forms of leucocytes being 2 to 6 per cent. In asthma and emphysema, some functional nervous diseases, and hepatic affections, the number, likewise, is often increased. No general deductions can be made.

PERNICIOUS ANÆMIA.

James Craig, of Dublin, ¹⁶_{Dec.1,'93} in connection with the report of a single case of pernicious anæmia, gives a summary of existing views as to the pathogenesis of the disease. Alfred Stengel, of Philadelphia, ⁸⁰_{June,'94} in the course of a paper on the nature, diagnosis, and treatment of pernicious anæmia, discusses the parts taken by hæmolysis and faulty hæmogenesis in its production. He adduces evidence to show that, while hæmolysis plays a most important rôle in the pathogenesis of the disease, the indications of faulty hæmogenesis, though less numerous, cannot be doubted.

H. M. Bowman ⁴⁷_{Summer,'94} reports a case in which pernicious anæmia was associated with disease of the spinal cord. This association was first observed by Lichtheim, and was commented upon in the ANNUAL for 1890. Bowman regards it as unwise to be too positive as to the relation of the nervous lesions to the altered blood-state, though he is inclined to regard the anæmia as primary and probably the cause of the changes in the cord. The spinal affection in Bowman's case belonged clinically and pathologically to the group of postero-lateral sclerosis.

Nonne, of Hamburg, ⁶⁸_{Aug., '94} reports two cases of pernicious anæmia complicated with symptoms of disease of the spinal cord somewhat resembling those of tabes. W. R. Gowers, of London,

reports²_{May 12, '94} a case of pernicious anæmia in a young man aged 21 years. The percentage of red corpuscles was scarcely 25, while that of the hæmaglobin was a little over 30. In addition, there were retinal hæmorrhages and pyrexia. No studies of the urine seem to have been made. The case derives its chief interest from the age of the patient, pernicious anæmia being very rarely observed under 25 years of age.

A. Baginsky, of Berlin,⁴¹_{Feb. 19, '94} reports a case of so-called pernicious anæmia in a child (sex not stated) 3½ years old. The case terminated fatally, and at the autopsy fatty degeneration of heart, liver, and kidneys was found to be the chief lesion. [It appears doubtful whether this case deserves to be included in the category of pernicious anæmia.—F. P. H.]

Askanazy⁵_{Sept., '94} reports the results of a microscopical examination of the blood in a rapidly-fatal case of pernicious anæmia. His contribution has special reference to certain alterations of the staining properties of the red cells. Fischel and Adler²_{Dec. 30, '93} report a case in which the symptoms of pernicious anæmia followed a wound of the heel. The authors regard the progressive anæmia as the result of a septicæmia having its origin in the injury to the foot, and recommend, in future cases of anæmia following injury, a similar search for micro-organisms.

Muir¹¹²_{June, '94} has studied the bone-marrow changes in five cases of pernicious anæmia. The changes most frequently found are: (a) increased number of nucleated red corpuscles in the marrow; (b) transformation of the fatty marrow in the shafts of the long bones into red marrow; (c) absorption of the bone-trabeculae between the red marrow.

Biruli²¹_{June 30, '94} describes the microscopical appearances of the brain in a case of pernicious anæmia. They consisted of hæmorrhages in the substance of the hemispheres; round, structureless bodies, resembling *corpora amylacea*, arranged in groups; fatty degeneration of the cells of the motor region; shrinkage and vacuolation of the cells of Purkinje.

A. Natanson²¹_{Aug. 11, '94} reports three cases of profound anæmia with retinal hæmorrhages, associated with tape-worm. The variety of the latter is not stated. H. Finley, of Carlisle, England,²_{June 16, '94} gives some brief notes of a case of pernicious anæmia which had been under the care of Barnes in the Cumberland Infirmary. The case,

like that reported by Gowers, derives its chief interest from the age of the patient,—26.

The “primary anæmias” are discussed in an editorial,⁹ Jan. 6, '94 the prevailing views as to the nature and pathogenesis of chlorosis and pernicious anæmia being fully considered.

Treatment.—Thomas R. Fraser, of Edinburgh,² June 2, '94 reports a case of pernicious anæmia successfully treated with bone-marrow. This substance was given uncooked to the amount of 3 ounces (90 grammes) daily. During the prolonged administration of iron and arsenic, in both medium and large doses, the condition of the patient had steadily deteriorated. In connection with the last-mentioned case, reference may be made to the fact that J. Dixon Mann⁶ Mar. 10, '94 treated hæmophylia and anæmic states, non-pernicious, with a glycerin extract of red bone-marrow, and with very encouraging results.

J. S. Risien Russell² Feb. 10, '94 reports a case which presented the clinical features of pernicious anæmia, and was successfully treated with iron and arsenic. Warfvinge, of Stockholm,¹⁴ Apr. 12, '94 has treated 21 cases of pernicious anæmia with iron and arsenic, the latter in the form of Fowler's solution,—4 drops thrice daily: 10 of the cases were cured without relapse; at least, up to the time of the report. Of the 11 others 5 had one relapse, 4 had two relapses, while the remaining 2 relapsed six times. Four of the first series of relapsed cases (those with one relapse) were well at the time of the report; the other 7 terminated fatally. In other words, 14 out of 21 were cured. Warfvinge compares the action of arsenic in pernicious anæmia with that of mercury in syphilis.

CHLOROSIS.

In a lecture on chlorosis, delivered at the London Hospital,¹⁰⁷⁷ Jan. 10, '94 Stephen Mackenzie discusses the prevalent views of the etiology, pathology, and treatment of that disease. He lays considerable emphasis on the statement that there is in chlorosis a greater tendency to inflammation of the optic nerve and retina than in pernicious anæmia, while the tendency to retinal hæmorrhage is considerably less. The latter fact is notorious, but the former is not so generally recognized.

M. E. Clément, of the Hôtel-Dieu, Paris,²¹¹ Feb. 9, '94 regards chlorosis as an infectious disease, basing this opinion on the enlargement of

the spleen (which he has found in thirteen cases), on the frequency of febrile movement, the occasional complication of phlegmasia dolens, and the epidemic occurrence of the affection. Chvostek ¹³_{July, '94} has also observed enlargement of the spleen in chlorosis, but regards it as "regenerative" rather than as the result of an infection.

Meinert, of Dresden, ⁵⁷_{Nov. 19, '93} claims to have demonstrated a displacement of the stomach (gastroptosis) in sixty consecutive cases of chlorosis. Fifteen per cent. of the cases were complicated with right movable kidney, and in one both kidneys were movable. The gastroptosis is secondary to enteroptosis, and this, in turn, to the pressure of the corset; so that, according to Meinert, it is to this article of female apparel that chlorosis is indirectly due.

F. Forchheimer, of Cincinnati, ⁸⁰_{Nov. 15, '93} contributes an article on the treatment of chlorosis which, however, is mainly devoted to the pathogenesis of the disease. He reiterates his views as to its intestinal origin and lays considerable stress upon the diagnostic importance of diminution of urobilin in the urine. He has also found a toxic body in the urine, "the exact nature of which it has been as yet impossible to determine," which he believes to be largely accountable for the nervous phenomena of chlorosis.

Augusto Murri, of Bologna, ⁵⁷_{Apr. 29, May 13, June 3, 10, 17, '94} contributes an elaborate article on the influence of cold in the etiology of chlorosis. He gives the notes of three cases in which the symptoms were limited to the cold months of the year, disappearing in summer and recurring during the succeeding winter, and states that others precisely similar have come under his observation. He therefore styles them winter chlorosis, or *chlorosis hiemalis*. O. Rosenbach, of Breslau, ⁵⁷_{June 17, '94} calls attention to the fact that he formerly ⁶⁹_{No. 19, '93} discussed the seasonal relations of chlorosis and used the term "winter chlorosis." It is evident that Murri's observations were, to some extent, anticipated by those of Rosenbach, and it is perhaps to be regretted that the Italian savant did not become earlier acquainted with the work of his German colleague. To Murri, however, belongs the credit of proving the unfavorable action of cold in many cases of chlorosis and the beneficial effect of a judicious hydropathic treatment designed to fortify the system against changes of temperature. As Murri points out, in his reply to Rosenbach, ⁵⁷_{June 24, '94} the analogy between the two contributions is chiefly one of nomenclature.

Carl von Noorden, of Berlin, ⁴⁵¹_{Apr., '94} in an article on tissue metabolism in chlorosis, discusses (1) the cause of the poverty of the blood in hæmoglobin; (2) the absorption of iron; (3) the reason why iron cures chlorosis; (4) the absorption of food in chlorosis. With regard to the first question he concludes that in chlorosis the destruction of hæmoglobin is probably much less than under normal circumstances. This follows from the fact demonstrated by Hoppe-Seyler and A. S. Garrod and confirmed by von Noorden, that the chief product of blood-destruction—hydrobilirubin—is found in the urine and fæces of chlorotics at the utmost in normal quantity; “indeed, as a rule, much less than this.” The cause of the poverty of the blood in hæmoglobin is, therefore, to be found in faulty hæmogenesis. The question of the *modus operandi* of iron in the treatment of chlorosis has been much discussed, and until quite lately the theory of Bunge was generally accepted. As is well known, Bunge holds that only such ferruginous nucleo-albumins as are found in the egg, in milk, and in grain-seeds are absorbed. In health these are amply sufficient to supply the organism with all the iron it needs. In chlorosis, however, owing to increased decomposition in the intestine and the consequent excessive formation of sulphuretted hydrogen, the ferruginous nucleo-albumin of the food is converted into sulphuretted iron, and thereby rendered useless for nutritive purposes. This, in brief, is the well-known theory of Bunge, and, as stated in last year’s ANNUAL, it was given its *coup de grace* by Ralph Stockman, of Edinburgh, who proved that sulphide of iron is therapeutically active in chlorosis. Von Noorden now adds the demonstration that the processes of albuminous decomposition are not unusually active in the intestine of chlorotics. This latter question was investigated by Rethers, of San Francisco, who, working under von Noorden’s direction, determined that in “eighteen cases of pure, grave chlorosis” the ethyl-sulphuric acids are not increased in the urine. The acids in question are always increased in the urine when the process of albuminous decomposition in the intestine is abnormally active.

It has been hitherto assumed that there is no absorption of iron salts administered medicinally, because, under such circumstances, the iron in the urine is not increased. Von Noorden refers to observations of Gottlieb and Kunkel, which prove that

the livers of animals to whom iron has been administered are much richer in that metal than the livers of animals who have not been so treated. The iron accumulates in the liver and spleen and is given out very gradually to supply the wants of the system. Von Noorden believes the curative effect of iron to be due to its stimulating effect upon the hæmatopoietic cells of the medulla of the bones. This he admits to be pure hypothesis, but considers it justified by the fact that he has had good results in the treatment of chlorosis with arsenic,—a metal that does not enter into the composition of the red cells. Other observers have found arsenic practically inert in chlorosis, and von Noorden admits greater success with that drug when it was combined with iron.

The absorption of food and the decomposition of albumin in chlorosis were investigated, under von Noorden's direction, by Lipman-Wulf. "The careful analysis of food, urine, and fæces showed that the nitrogen equilibrium of his three female patients was kept up perfectly under the food administered, and that they did not lose a trace of body-albumin. The tissue metamorphosis took place in exactly the same manner as would have been expected in perfectly-healthy persons."

Giovanni Lava, of Turin, ⁹⁹⁷_{May 31, June 14, '94} has investigated, in six cases of chlorosis, the relations between the hæmoglobin percentage, the secretion of hydrochloric acid in the stomach, and the excretion by the kidneys of urea and chlorides. His conclusions are the following: 1. In chlorosis there is an exaggerated secretion of HCl, manifesting itself by excess of free HCl, the quantity of this acid in combination with albuminous bodies being diminished. 2. The increase in the secretion of HCl bears no relation to the reduction of hæmoglobin. 3. Until the percentage of hæmoglobin is reduced to one-third or one-fourth of the normal amount, there is no increase in the daily excretion of urea; on the contrary, the amount of the latter, as well as that of the chlorides in the urine, is diminished. 4. The diminution of the excretion of urea and chlorides bears no definite relation to the reduction of the hæmoglobin. 5. As the hæmoglobin increases in response to ferruginous treatment, the HCl in the stomach does not diminish. The amount of free HCl remains above the normal and that combined with albuminous substances below the normal, precisely as before treatment. 6. With improvement in the condition of the blood, the

excretion of urea augments, and in a ratio greater than that of the increase in hæmoglobin. 7. Neither before treatment nor during its course was any relation observed between the HCl secretion of the stomach and the excretion of urea and chlorides by the urine. 8. The improvement in the general condition coincident with the increase of the hæmoglobin is independent of the excessive acidity of the stomach. The nature of the gastric secretion is in no constant relation to the amount of hæmoglobin in the blood; and, finally, a definite percentage of HCl in the gastric juice is not essential to normal digestion, provided the other functions of the stomach, besides the secretory, are intact. L. Cantù, of Pavia, ⁹⁹⁷May 10, '94 has also investigated the digestive function of the stomach, and finds that, as a rule, there is an hypersecretion of HCl.

An admirable contribution to the subject of chlorosis has been made by K. Osswald, ³⁴July 3, 10, '94 formerly Riegel's assistant at Giessen. It is based upon a series of examinations of the gastric juice of chlorotic patients, and contains a review of previous observations of the same sort. His conclusions are the following: 1. The amount of HCl in the gastric juice is not diminished in cases of chlorosis; on the contrary, there is a state of hyperacidity in 95 per cent. of the cases. 2. The dyspeptic disorders of chlorosis are neither due to a deficiency of HCl nor to motor insufficiency of the stomach. 3. The indiscriminate employment of hydrochloric acid in cases of chlorosis is to be condemned. 4. The theories which refer either the origin of chlorosis or its chronic character to a state of gastric subacidity are untenable.

In some observations on chlorosis Warfvinge ⁸⁴⁴Aug. 26, '94 points out the well-known striking differences which distinguish it from other varieties of anæmia and stamp it as a morbid entity, and intimates his belief that it may yet be reckoned among the infectious diseases.

At a meeting of the Société Médicale des Hôpitaux, Hanot, of Paris, ¹⁴Apr. 15, '94 reported a case of chlorosis with uræmic symptoms, and suggested that renal disease occurring in the course of that affection might be due to irritation of the kidney by incompletely-oxidized products of disassimilation. In the discussion of Hanot's paper Hayem remarked that, in his experience, albuminuria in the course of chlorosis was exceedingly rare.

Bihler ³¹⁹June 9, '94 has estimated the blood-pressure in fifty chlorotic

women, using for this purpose Basch's sphygmomanometer. In all the cases he found the pressure diminished. Richard Kockel³_{Sept. 6, '94} reports five cases of venous thrombosis in the course of chlorosis. In three the seat of the disease was the femoral vein, while in two others the vena magna Galeni and the neighboring sinuses were involved.

Lucas-Championnière²¹²_{June 10, '94} reports a case of chlorosis occurring in the hospital service of Grancher. The patient was a boy, 12 years old, whose illness had begun two months before admission. The number of red corpuscles per cubic millimetre was found, at the first examination, to be 960,000, no mention being made of their size and shape nor of their percentage of hæmoglobin. The number of white cells was normal. Under treatment the number of the red cells increased to 2,400,000. At the end of six weeks the boy died from an attack of erysipelas, the temperature rising to 41° C. (105.8° F.). He had previously had a brief febrile attack lasting twenty-four hours, the day after admission, the temperature, on that occasion, rising to 40° C. (104° F.). [In my opinion the case resembles pernicious anæmia quite as much as chlorosis.—F. P. H.]

Lloyd Jones²_{July 28, '94} advances somewhat novel views concerning the blood in chlorosis. He regards the disease as an "exaggeration of a change which occurs in the blood of the healthy female at puberty, and which leads to an increase of the amount of blood-plasma associated with a diminution of the amount of hæmoglobin." According to Jones, "this change in the blood of the healthy female has for its end the storing up of material to serve as food for the fœtus during each pregnancy." Those healthy persons who have the greatest number of brothers and sisters are said, by Jones, to "have blood which possesses in the most marked degree the characters of female blood, namely: (1) abundance of blood; (2) abundance of serum; (3) low specific gravity of the whole blood, and relatively little hæmoglobin."

C. F. Martin, of Montreal,²_{July 21, '94} reports four cases of what he regards as chlorosis in the male, the diagnosis being based upon symptoms of ill health, such as may accompany that disease, combined with a normal number of red corpuscles and a deficiency of hæmoglobin, the percentage of the latter amounting in one of the cases to 68. Martin's paper was suggested by the statement of

Lloyd Jones ²_{Jan. 20, '94} that for eight years he had searched in vain for the record of any case of undoubted chlorosis in the male. Controversies concerning the existence of a disease can never be settled without some common diagnostic point of agreement. Jones apparently regards the diminished specific gravity of the blood as the pathognomonic mark of chlorosis, while Martin considers the diminution of the hæmoglobin percentage as the chief diagnostic feature.

Hammerschlag ²²_{July 25, '94} has carefully studied the blood in eight typical cases of chlorosis, and concludes that nucleated red corpuscles, megaloblasts, and "mark cells" (myelocytes) cannot be regarded as characteristic of pernicious anæmia, since he has found them in the blood of the above-mentioned cases. Robert Bell, of Glasgow, ⁴⁵¹_{Mar., '94} discusses the blood changes in anæmia, chlorosis, gout, and rheumatism, and particularly emphasizes the influence of constipation in their causation. His paper, which deals from a clinical stand-point with questions that have been studied in the laboratory by Haig and Lloyd Jones, is worthy of careful study.

L. Vanni, of Modena, ³¹⁹_{Apr. 14, '94} has endeavored to test the coprostatic theory of chlorosis by inducing in animals an artificial state of constipation and then examining their blood. For the former purpose he occluded the anal orifice with sutures. The chief effects of this operation upon the blood were: diminution of the red corpuscles; increase in the number of the white cells; diminished resistance of the red to hæmolytic substances; little or no diminution in the percentage of hæmoglobin. In spite of the diminution in the number of the red corpuscles, which he believes to be due to increased hæmolysis, Vanni does not regard his experiments as corroborative of the coprostatic theory, since the decided diminution in the percentage of hæmoglobin, which is so characteristic of chlorosis, was not produced.

F. Chvostek ³¹⁹_{Apr. 14, '94} reports seven cases of chlorosis complicated with the signs and symptoms of exophthalmic goitre, the latter disappearing as the condition of the blood improved and, therefore, presumably symptomatic. Chvostek, however, leaves the question open as to the exact relation between the two conditions.

Treatment.—Carl von Noorden, of Berlin, ⁴⁵¹_{May, '94} contributes an article on the dietetic treatment of chlorosis. This, he states, should vary somewhat, according to whether the patient is lean or

fat. Lean patients should be given food "copious in quantity and favoring the deposit of adipose tissue." This includes large quantities of butter and such "amylaceous foods as do not irritate the stomach," and about 80 grammes ($2\frac{2}{3}$ ounces) of meat per diem. Unnecessary muscular exertion and exposure to cold should be forbidden, and in some cases absolute rest may have to be enjoined. The fat chlorotics may be allowed as much as 120 grammes (4 ounces) of albumin per diem, and, in addition, no more fat and carbohydrates than will cause the nutritive value of the food to exceed 36 calories per kilogramme ($2\frac{1}{5}$ pounds) of body-weight.

In the medicinal treatment of chlorosis Jaccoud ⁴⁵¹ recommends inhalations of oxygen and organic preparations of iron, such as the tartrate, citrate, and oxalate. P. le Gendre, of Paris, ¹⁰⁸ Feb. 15, '94 believing that nearly all chlorotics are dyspeptic, does not limit his treatment of such cases to the mere administration of iron. In cases of atonic dyspepsia he orders before meals the simple bitters, such as quassia or gentian, or excitors of the smooth muscular fibres, such as strychnia or brucia. At the end of the meal, or half an hour after it, the patient is directed to take a wineglassful of hydrochloric-acid lemonade (3 or 4 parts to 1000). If there is gastric dilatation, naphthol, salicylate of bismuth, and chloroform-water are given three or four hours after the meal, in order to limit or stop the abnormal fermentations generally present in that condition. Hyperacidity is treated with full doses of alkalies from one to two hours after meals.

John Harold, of London, ¹⁵ Aug., '94 reports three cases of chlorosis successfully treated with ferratin. A. Haig, of London, ² July 21, '94 gives the result of his further researches concerning the causation of anæmia and the blood changes produced by uric acid. He attributes chlorosis to the accumulation of uric acid in the blood, and states, with the greatest persistence, that "iron cures anæmia by clearing the blood of uric acid; that the administration of uric acid will quickly undo its work; and that if, in any case, it fails to clear the blood of uric acid, it also fails to cure the anæmia." When iron fails to cure chlorosis Haig recommends its suspension and the administration of mercurials and salicylates until the blood is cured of uric acid, after which improvement may occur even without the resumption of the iron.

LEUKÆMIA AND PSEUDOLEUKÆMIA.

H. F. Müller⁸⁵⁴_{Nos. 13, 14, '94} contributes an elaborate compilation of the literature bearing upon the morphology of the blood in leukæmia and the value of such studies in proof of the nature of the disease. The important questions for decision are the relationship of the myelocytes, or marrow-cells, to the large cells of leukæmic blood; the determination of the amœboid movement of the leucocytes in leukæmic and non-leukæmic blood and in the cells of the marrow; and the process of cell-proliferation in the blood-making organs and in the blood. He passes in review the work and theories, regarding leukæmia, of Virchow, Mosler, Biesiadecki, Löwit, Hayem, Ehrlich, as well as his own previous work. The evidence as presented by Müller points strongly to the correctness of Virchow's theory, that leukæmia is a disease primarily of the blood-making organs, and that the increase of leucocytes takes place in these organs. The opposite theory—that of Biesiadecki and Löwit—that leukæmia is primarily a disease of the blood itself, and that the increase of the leucocytes takes place by decreased destruction of leucocytes, seems to us, as it does to Müller, fanciful and unsupported by sufficient evidence.

A large part of Müller's paper is devoted to the review of literature concerning the marrow-cells, or myelocytes. These he believes to be identical with the cells of the marrow, and not ordinary leucocytes increased in size by hyperplasia; and he shows a strong belief in their value as elements indicative of a myelæmic form of leukæmia, though not absolutely diagnostic.

Ebstein, of Göttingen,⁶⁹_{July 19, '94} reports several cases and discusses the literature bearing on the relation of traumatism to leukæmia. In one case he considers two possibilities,—first, that the spleen was injured by severe concussion, and, second, that the long-continued nervous disorder following the injury occasioned the leukæmia. The latter appears to us the more probable, but in either case the relation of the trauma to the disease is entirely suppositional. In other cases the evidence is no more conclusive, and, altogether, Ebstein's paper leaves the question as little decided as before.

A doubtful case of what is termed acute leukæmia is reported by Stewart and Adami, of Montreal.²⁸²_{June, '94} A man of 60 years had high fever and enlargement of all the lymphatic glands. There

were hepatic and splenic enlargement and leucocytosis, the proportion of white to red corpuscles being from 1:50 to 1:30. The increase was almost solely in the polynuclear forms. The patient died in three weeks. Adami found abundant streptococci in the sternal marrow, spleen, liver, kidneys, and lymph-glands. They differed slightly in the manner of growth from the streptococci in suppuration and erysipelas. A further report is promised. The increase of the polynuclear elements alone is strongly against leukæmia.

Fr. Schultze, of Bonn, ²²⁶_{B.52,'94} reports fifteen cases of leukæmia, in none of which was there any clear evidence of the cause of the disease. Of the manner of onset, the author very justly remarks that pallor may be absent for a long time. Priapism is a common symptom at the onset. It is due to thrombosis in the corpus cavernosum, and may be a lasting symptom. Among the complications, phlebitis and periphlebitis of the lower extremities and attacks of renal colic (probably due to coagula of blood) were noted.

Dunn ⁵_{Mar., '94} reports a case of leukæmia, in a child of 8 years, in which the most interesting feature was the existence of a crescentic tumor in each upper eyelid. The first evidence of the disease was a swelling in the left parotid gland, which increased greatly in size and became as hard as a stone. There was considerable leucocytosis (red corpuscles, 1,708,000; leucocytes, 122,000). Epistaxis, an intercurrent attack of diphtheria, and constant febrile temperature, varying from 99° to 101° F. (37.2° to 38.3° C.) were notable features. The author cites a number of similar cases in literature.

Brannan, of New York, ⁸¹⁴_{May 16, '94} reports a case of spleno-myelogenous leukæmia, not remarkable except for the blood-count at the first examination. There were 260,000 leucocytes, 880,000 red corpuscles, and 30 per cent. of hæmoglobin. This unusual reduction of the red corpuscles and the great relative proportion of hæmoglobin were probably inaccurate, from the change which was noted at the next examination.

Stanley ³²_{Jan., '94} reports briefly three cases of spleno-medullary leukæmia and in detail the characters of the blood in each. As a result of these studies he concludes that the myelocytes are identical with marrow-cells, and are present in increased amount

because of some abnormal activity in cellular proliferation in the marrow. Boyd,¹⁵_{Aug., '94} in reporting a case, comes to a similar conclusion, that the marrow changes are, as a rule, the first and the essential, though subsequently often overshadowed by the splenic and lymphatic, manifestations. In the same case McWeeney,¹⁶_{July 14, '94} called attention especially to the presence of large numbers of nucleated red corpuscles, and to free nuclei of such. The latter seemed to have been extruded from the cell. Indistinct evidence of mitosis was also a common feature of these nucleated red cells.

Morse⁹⁹_{Aug. 9, '94} reports a case of leukæmia associated with rickets in a child 1 year old, with glandular enlargement, swelling of the spleen and liver, and purpura. The blood-count showed 2,900,000 red corpuscles and 48,000 leucocytes. The proportions of the different forms of leucocytes were: lymphocytes, 23.4 per cent.; large lymphocytes and transitional elements, 8.1 per cent.; myelocytes, 21.4 per cent.; polynuclear, 46.5 per cent.; eosinophiles, 0.6 per cent. There were numerous nucleated red corpuscles and poikilocytes. Karyokinesis was noted in some red corpuscles. The author cites twenty cases of infantile leukæmia reported in literature, but doubts the genuineness of more than a third or half of these. In most cases of older date no blood-examination is recorded.

Finley and Adami²⁸²_{Mar., '94} report the case of a child, aged 11 years, as one of chronic intermittent leukæmia. There are, however, a number of points which make the diagnosis doubtful, especially the facts that no alteration was noted in the character of the white corpuscles, and the nature of the splenic enlargement. The latter was such as occurs in chronic splenic hypertrophy of various kinds.

Kissel³¹_{Mar. 24, '94} reports three cases of Hodgkin's disease in children of 11, 4, and 4 years, respectively. An interesting feature of these cases was the occurrence of febrile paroxysms at short intervals. During these paroxysms the glandular swelling was noted to increase.

Audeoud¹⁹⁷_{Sept. 20, '94} reports a case which he considers one of von Jaksch's infantile pseudoleukæmia. The child was profoundly rachitic, became gradually ill, and had progressive enlargement of the abdomen. The spleen was very large. No accurate examination of the blood was made, but leucocytosis was very slight.

Fische⁵_{June, '94} reports, under the same title, the case of a rachitic child of a little over a year, which had enlarged glands, enlarged liver, and great enlargement of the spleen, with decided leucocytosis (1 to 9). He does not decide definitely against the diagnosis of true leukæmia. Very properly, we think, he regards von Jaksch's pseudoleukæmic infantile anæmia not as an autonomous disease, and in this opinion he was ably supported in the discussion by Ebstein.

Mathes, of Jena,⁴_{June 4, 11, '94} examined the blood of two cases of leukæmia to determine the existence of peptone and allied bodies. In neither of the two cases examined did he find peptone in the blood, but in each there were dentero-albumoses in the blood and serum. In the serum of one case there was also nucleo-albumin dissolved in the fluid. This probably resulted from destruction of blood-corpuscles. The excretion of uric acid was only moderately increased.

Treatment.—Colin Campbell²_{Mar. 3, '94} reports a case of leukæmia in which there had been apparent cure under large doses of arsenic. The disease relapsed and large doses of arsenic and other remedies failed. Finally, fresh spleen and glycerin-extract were given by the mouth and under the skin; also, fresh bone-marrow from mutton-bone, thyroid extract, and testicular fluid,—all, however, without avail.

Anderson²⁸⁵_{Nov. 15, '93} saw considerable improvement under constant administration of arsenic in a case treated but one month. * Bigger⁶_{p. 682, '94} had excellent results from the treatment of a case of leukæmia, in a lad of 12, with bone-marrow. The marrow was taken raw, spread on bread, and after a few days was not particularly disagreeable. The improvement was said to be little short of marvelous.

Paul Jacob⁶⁹_{Aug. 9, '94} records a case of leukæmia which was treated by injections of splenic extract. After these injections there was very little pain, but copious sweating and fearfulness, with which dyspnœa was sometimes associated. The effect on the blood was a decided decrease of the number of leucocytes immediately after the injection, followed later by an increase; not sufficient, however, to restore the number to that previously present. This result Jacob does not interpret as an evidence of real improvement in the disease, but rather as an apparent change due to retention of the

leucocytes in the capillaries of the lungs. The same case was utilized by Krüger for the investigation of the excretion of uric acid and the xanthin bases, all of which he found increased above the normal. There was still greater increase of these excreta after each injection, with subsequent diminution.

SCURVY, PURPURA, AND HÆMOPHILIA.

A very important contribution on infantile scurvy in America is published by Northrup and Crandall, ¹ _{May 26, '94} from private experience and from collected cases. In 1891 Northrup published the first two cases under his observation, and was able to collect nine others. At the meeting of the Academy of Medicine of New York, February 15, 1894, 106 cases were reported, to which 8 have since been added, making the American record now 114. Of these the authors have obtained and tabulated the detailed histories of 36. Of 32, in which sex is mentioned, 16 were males, 16 females. The youngest child was 4 months, the oldest an idiot of 6 years; but 63 per cent. of all cases occurred from the eighth to the thirteenth month. Unhygienic surroundings were clearly not an important feature. In over 63 per cent. of the cases the diet consisted of proprietary foods and condensed milk. The evidence indicates also that milk sterilized for a long time at a high temperature is capable of causing the disease. Anæmia was definitely noted as present in 15 cases and as absent in but 1 case. The evidence was strongly against the existence of such a disease as acute rickets, though rickets was noted as an associated condition in 11 cases. Fever was frequent. Pseudoparalysis is frequent and subsides with the decline of the scorbutic symptoms. Pain is the most frequent symptom of all, and is developed early. Subcutaneous hæmorrhages occurred in 15 cases. The gums are nearly always spongy or ulcerated when teeth have appeared. Swelling of the extremities is a characteristic symptom, almost always affecting some part of the lower limbs, more frequently above than below the knee. The study of the treatment of the disease indicates very clearly that fresh cows' milk is by far the most important element in the cure of the disease. Mere tonic treatment was, without exception, unsatisfactory. Orange-juice and fresh beef-juice are valuable adjuvants, and it is well to add barley-water to the milk.

Sutherland, of London, ¹⁵_{Feb., '94} also contributes an interesting *résumé* of the same subject, and brings forward a number of statistical details based on collected cases. He disagrees with the view of Charpentier, that fresh cows' milk ever causes the disease; but warns against the assumption that milk, as supplied in cities, is to be looked upon as reliable in all cases. In fifty-three cases collected by him, in which the month of onset was stated, the great minority occurred during the months of the fruit season,—June to September. As to age, he found, of 71 cases, that 57 occurred before the second year and but 14 after that age. This he explains by the fact that, after two years, the children of the poor, especially, partake largely of the same diet as adults. Unlike Northrup and Crandall, he found the involvement of the gums frequently very trivial or altogether wanting, even when teeth had made their appearance. He points out that a rachitic diathesis strongly predisposes to marked affection of the periosteum (subperiosteal hæmorrhage), and he calls attention to œdema of the eyelids as a symptom of considerable diagnostic importance. A manifestation of great prognostic significance is cardiac asthenia with tendency to syncope, and he refers to one of his cases in which this proved fatal. In the treatment of the disease the author relies mainly on fresh cows' milk, fruit-juices, and potato or other vegetable soups. Meat-juice appears to him to possess little value.

Fruitnight, of New York, ⁵¹_{July, '94} contributes an interesting paper on the same subject, in which he details the histories of six cases, one of them previously reported by H. L. Taylor. ⁸¹⁴_{Feb. 1, '94} In each of these cases the characteristic swelling of some part of the lower extremities was present, and in each there was distinct disease of the mouth. The author considers the differential diagnosis of the disease and emphasizes the importance of swelling and tenderness of the epiphyseal end of the femur or tibia, sponginess of the gums, and rapid improvement under antiscorbutic treatment as a diagnostic triad. An interesting feature of Taylor's case was a swelling over the first and second lumbar vertebræ, which, with pseudo-paralysis and other symptoms, had led previous medical advisers to the diagnosis of Pott's disease.

Mary Delano Fletcher ⁷⁷_{Mar., '94} reports a case of infantile scurvy in a child of 10 months, of unusually good general appearance.

There was great soreness of the mouth in addition to marked tenderness of the legs and, later, proptosis. A similar case is reported by Rehn.³⁶⁶_{Dec., '93} In this case bacteriological examinations of the blood were made with entirely negative results. The author is, furthermore, convinced, from a general study of his case, that the disease is purely a result of dietetic errors.

Railton⁶_{Mar. 3, '94} reports three cases and points out the frequent association with rickets, both being dependent on the same dietetic errors. In none of his cases were the gums affected. In one there was hæmaturia.

Babes,⁵⁹_{May 19, '94} in studying three cases of scurvy bacteriologically, found a thin, long, wavy bacillus, prone to occur in clusters in the gums, the lungs, and other viscera. There were also streptococci in the gums. He inclines to the view that the bacillus is peculiar to the buccal cavity and that, in consequence of depreciation of the general health, it is stimulated to activity. Inoculation in animals causes death with development of characteristic lesions. Bornträger³¹¹_{B. 6, H. 2, '93} is also of the opinion that scurvy is a bacterial disease, and has himself isolated a coccus from the minute hæmorrhages in the spleen of a person dead of this disease. He admits that the etiological relation of this and other organisms has not been fully established.

A writer,²⁶⁷_{Feb. 15, '94} animadverting upon purpura hæmorrhagica, asserts that this affection, which is so very prevalent among the "bush-residents" of Australia, is really a form of scurvy and dependent upon the neglect of or even aversion for fresh vegetables so common among these people.

Bates, of Poughkeepsie,⁹⁶_{May, '94} reports a fatal case of hæmophilia, following extraction of a tooth, in a young man. There was no family history. Twice before he had suffered serious hæmorrhages after the extraction of teeth. The author refers to two similar instances, not fatal, and to one of serious hæmorrhage after the snipping of the frænum of the penis in an infant. Olivier, of Paris,⁴⁸_{July, '94} observed an interesting case of hæmophilia in which serious hæmorrhage attended the first menstruation. Caillé, of New York,⁴⁶²_{Apr., '94} reports three interesting cases of hæmophilia, in one generation of a family, presenting no distinct family history.

Wightman⁶_{Mar. 3, '94} reports, from the wards of R. W. Murray,

of Liverpool, three cases of hæmophilia occurring in first cousins. Each suffered from the usual sudden swelling of the joints and from some one or other form of hæmorrhage. The mother of one of the patients has traced the disease backward five generations, and finds twelve cases among fifty-two persons. Six males and the only female affected died of hæmorrhage in some form.

Knudtzon,⁹⁹⁶_{May 25, '94} in reporting two cases of hæmophilia in cousins, remarks on the rarity of this condition in Norway.

Albertoni,³⁶_{Sept., '94} investigating the blood in scurvy and hæmophilia, found the iron in the former diminished by one-third, and that without great decrease of red or white corpuscles. In hæmophilia there is, he believes, a too rapid breaking up of the red blood-corpuscles and fragility of the vessel-walls.

SPLEEN.

Howe⁹_{Oct. 7, '93} reports a case of abscess of the spleen supposed to have been caused by a "bruise." The abscess was opened and drained and tonics administered, with the result that the man recovered entirely. Finlay²_{Apr. 21, '94} reported to the Clinical Society of London a case in which the diagnosis of left-sided pleurisy was made. The spleen contained a large primary and several smaller abscesses connected with it; the right lobe of the liver was riddled with small abscesses. Puerperal sepsis seems the most likely cause in this case. Another, mentioned in the discussion, was due to ulcerative endocarditis. Sander³³⁶_{No. 3, '94} reports a splenic abscess, in a girl 4 years old, which opened spontaneously through the abdominal wall and went on to recovery. He regards it as primary abscess of the spleen, no antecedent condition that might have caused it being found.

Terrier¹⁴_{Apr. 15, '94} reports a case in which the symptoms of a violent peritonitis were found due to torsion of the pedicle of the spleen. The organ was removed, and the patient recovered completely.

Pantjuchow²¹_{Aug. 11, '94} presents statistics on the weight of the spleen in certain residents of Tiflis. Among Russians the average weight was 285 grammes (9 ounces); among various native peoples, 505 grammes (1 pound); the average weight in persons dead of malignant malaria was 543 grammes (17 ounces); chronic malaria, 790 grammes (25 ounces); and in one person he found the spleen 3442 grammes (7 pounds) in weight.

TRANSFUSION AND SALINE INJECTIONS.

Von Ziemssen, of Munich, ³⁴_{May 1, '94} again recommends his method of direct transfusion of blood, as noted in the ANNUAL of last year. He believes that repeated transfusions may prove of value, in cases of chronic progressive anæmia, by stimulating the blood-making organs.

Dominicis, of Naples, ⁵⁹_{Apr. 14, '94} at the Medical Congress at Rome, advocated the direct transfusion of arterial blood from the dog to man. The profession will, however, be reluctant to accept this procedure.

Jennings ²_{Jan. 20, '94} warns against the injection of too large quantities of saline solution, on the ground that the residual blood is too much diluted. He advises instead, in cases of large hæmorrhage, the use of mixtures of blood and saline fluids. Cobb ⁹⁹_{Sept. 28, '93} reports six cases of hæmorrhage or shock in which saline solutions were introduced under the skin, with very satisfactory result. A tube and funnel, raised four to six feet, supply the needed pressure.

Bidwell ²²_{Nov. 8, '93} describes a new apparatus for intra-venous injection. It consists of a funnel and tube, with a bent metallic cannula which bears a double collar so as to be readily bound in the vein. The liquid in the funnel should have a temperature of 100° F. (37.7° C.), so as to allow for the cooling which occurs in the apparatus.

Hayem ¹⁴_{Mar. 14, '94} has found that the coagulation of blood which follows transfusion of serum derived from another, or even the same, animal species may be prevented by previously heating the serum to 56° C. (132.8° F.). Daremberg has shown that the same degree of heat destroys the globulicidal action of serum. The nature of the chemical changes induced by the heat, as indeed the nature of the substance or substances destroyed, is unknown.

Dastre ¹⁴_{Nov. 1, '93} advances the belief that injection of saline solutions into the blood may prove effective in the elimination of toxins, but has not published details of his work. Hutchinson ²⁸²_{Feb., '94} reports favorably on the effect of saline enemata in a case of acute anæmia due to post-partum hæmorrhage. Merkel ³⁴_{Aug. 21, '94} reports three cases from obstetric practice in which large injections of normal salt solution were used hypodermatically, with good effect. Feis ¹¹⁶_{Feb., '94} also reports three cases which fully show the value of hypodermoclysis of salt solution.

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813. Mississippi Med. Monthly, Meridian.
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823. Archivio della riforma medica, Naples.
824. Quarterly Medical Journal, Sheffield, England.
825. Annales des sciences psychiques, Paris.
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829. Pharmaceutical Journal of Australasia, Sydney, N. S. W.
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1034. Revue chirurgicale, Paris.
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1050. Revista de la Sociedad medica Argentina, Buenos Ayres.
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1054. The General Practitioner, St. Louis.
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1056. Hygieia, Stuttgart.
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1068. Tablettes mensuelles de la Société royale de médecine publique de Belgique, Bruxelles.
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1078. Yüjno-Rüsskaia Meditzinskaia Gazeta, Odessa.
1079. Sanative Medicine, Westerville, O.
1080. Chicago Clinical Review.
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1082. Budapester Hygienischer Zeitung.
1083. Revue médicale de la Franche-Comté.
1084. Aerztliche Rundschau.
1085. Archivii ed atti della Società Ital. di Chirurgia.
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1090. Revue Neurologique, Paris.
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1154. New York State Medical Reporter, Rochester.
1155. Revue Mensuelle de Stomatologie, Paris.
1156. Rivista di Patologia e Terapia delle Malattie della Gola, del Naso e dell' Orecchio, Florence.
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